

SCOTTISH DEVELOPMENT DEPARTMENT
MIDLOTHIAN AND WEST LOTHIAN JOINT
PLANNING ADVISORY COMMITTEE

THE LOTHIANS REGIONAL SURVEY AND PLAN

Volume Two

*Physical Planning
Aspects*



EDINBURGH

HER MAJESTY'S STATIONERY OFFICE
1966

The Lothians Regional Survey and Plan

VOLUME TWO

prepared for

MIDLOTHIAN AND WEST
LOTHIAN JOINT PLANNING
ADVISORY COMMITTEE

consisting of
representatives from the County Councils
of Midlothian and West Lothian and
the Development Corporation of
Livingston New Town

and

SCOTTISH DEVELOPMENT
DEPARTMENT

in

THE UNIVERSITY OF EDINBURGH

by the Regional Consultants:

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PREFACE AND ACKNOWLEDGEMENTS

by the Physical Planning Consultants, Professor Sir Robert H. Matthew and Professor P. Johnson-Marshall

As stated in Volume One, the Lothians Regional Survey and Plan has been carried out by a team drawn from the Department of Architecture of the University of Edinburgh, and the Department of Social and Economic Research of the University of Glasgow. The first official reference to the Survey and Plan are to be found in a proposal in the White Paper 'Draft New Town (Livingston) Designation Order 1962', which recommended "the preparation of a comprehensive regional scheme of development" for the whole region surrounding Livingston New Town, so that "industrial expansion in West Lothian and north-west Midlothian may be co-ordinated and the many problems of agriculture, transport and social and recreational facilities examined and dealt with as a whole" "The Secretary of State believes, therefore, that the regional development scheme should also make provision for the systematic rehabilitation of derelict areas to bring into economic use such land as can reasonably be recovered and to improve the appearance of that which cannot."

In May 1962, the Secretary of State for Scotland commissioned Professor Sir Robert H. Matthew, Head of the Department of Architecture, Edinburgh University, and Professor Donald J. Robertson, Head of the Department of Social and Economic Research, Glasgow University, as Joint Consultants to prepare this Physical and Economic Survey and Plan for the Lothians Region - an area of approximately one hundred and thirty-three square miles, with a population of seventy eight thousand people and embracing Scotland's fourth New Town at Livingston. In February 1964, at the invitation of the Midlothian and West Lothian Joint Planning Advisory Committee, Professor P. Johnson-Marshall, Director of Planning Research Unit of the Department of Architecture in the University of Edinburgh, also became a Consultant.

A Joint Planning Advisory Committee, known as the Midlothian and West Lothian Joint Planning Advisory Committee, consisting of representatives of the two County Councils and of Livingston Development Corporation, with observers from the Scottish Development Department, was established in 1963. This Committee of officials ratified the Consultants' terms of reference which were as follows:-

- 1 To carry out a Survey and prepare a scheme of development and rehabilitation for the area comprising the parishes of Bathgate, Ecclesmachan, Kirkliston, Livingston, Mid Calder, Kirknewton, Uphall, West Calder and Whitburn within the Counties of Midlothian and West Lothian.
- 2 The Survey to cover:-
 - a an examination of the physical possibilities of the Area, including the potentiality of the land for different uses, the degree of expansion of which the different towns and villages are capable, the problem of derelict land and land damaged by mining subsidence and the problem of redevelopment in existing built-up areas.
 - b an evaluation of the economic potentialities of the Area including the prospects for future economic expansion, the relationship

between industrial growth, and local and central Government Capital Investment, transport and communication facilities and the future composition of the population and labour force (allowing for the intake of some overspill population).

- 3 The scheme of development and rehabilitation will be in the form of an Advisory Plan covering both the physical planning aspects in terms of the Town and Country Planning (Scotland) Acts, 1947-59, and the economic aspects, including proposals for capital investment and measures to stimulate economic growth.
- 4 A report on the survey together with the scheme of development and rehabilitation will be presented to the Joint Planning Advisory Committee in 1964.

The Lothians Regional Survey and Plan Technical Committee was also established under the chairmanship of Mr. Robert Grieve, Chief Technical Planning Officer, Scottish Development Department, to consider the technical problems associated with the preparation of the Lothians Regional Survey and Plan and the development of Livingston New Town. This Committee consisted of technical representatives of the Scottish Development Department, the two Counties, Livingston Development Corporation and the Consultants. To assist the Technical Committee in its task, four Working Parties, consisting of representatives from a large number of authorities concerned with the ultimate implementation of the Plan, were established to investigate Rehabilitation, Services, Roads and Recreation.

The terms of reference of these Working Parties were established by the Technical Committee, and were as follows:-

1 Rehabilitation Working Party

"To consider and list for the Scottish Development Department, in advance of the Department's approach to Local Authorities, short-term rehabilitation proposals in order of priority, bearing in mind long-term aspects, and to determine the agencies involved in carrying out these proposals."

2 Services Working Party

"To consider the programming of expenditure and works for drainage, water and refuse disposal in conjunction with developments in the New Town and Survey Area."

3 Roads Working Party *

"To consider and report through the Technical Committee to the Scottish Development Department, and for the advice of the Consultants on layout, classification and timing of the road pattern in the Regional Survey Area up to 1970."

* In June 1964 a Joint Working Committee on Railway Services was set up to examine: (a) "the projection of a long term plan for the provision of both passenger and freight rail facilities to serve the Livingston Growth Area as defined in the White Paper (Central Scotland - A Programme for Development and Growth. Cmd 2188. November 1963)" and (b) "what existing rail facilities should be retained to fit into the projected requirements".

4 Recreation Working Party

"To evaluate the existing recreational facilities within the Lothians Survey Area, and to estimate the requirements of an eventual population of two hundred and thirty thousand persons."

All these Committees have formed a valuable and useful experiment in joint co-operation between the Consultants, Central and Local Government and other organisations, providing a forum for the exchange and development of ideas and information among all the Technical Officers concerned.

The complete Lothians Regional Survey and Plan is presented in two Volumes. Volume One, which is concerned with the social and economic aspects of the Survey and Plan, has been prepared by the University of Glasgow. Volume Two, which is concerned with physical planning, has been prepared by the University of Edinburgh. Both volumes are necessary for a full understanding of our joint proposals.

Volume Two consists of a Regional Advisory Master Plan for the Lothians Area, supported by surveys, detailed studies and a written report. The latter consists of fifteen chapters, with explanatory diagrams and appendices. The general arrangement of the material is designed with a view to easy reference, and is as follows:-

Chapter 1 consists of the Preamble, which contains an outline of the Regional Survey and Plan, describes how the main proposals in the Regional Master Plan were reached, and discusses the regional implications of the New Town of Livingston together with other major proposals.

Chapter 2 deals almost entirely with the physical character of the Area.

Chapter 3 to 14 each take a special aspect of the Region, and wherever possible are presented in a common form, consisting of Survey of existing conditions, Principles, Proposals and Summary. Chapter 15 sets out proposals for a new regional landscape pattern.

The Appendices deal with detailed statistical and other informative material, which was obtained by carrying out studies which are described in the relevant Chapters.

A full list of diagrams, tables and plans is given in the Contents.

In conclusion, we would like to express our warm appreciation and pleasure to Professor Donald Robertson and his colleagues in the Department of Social and Economic Research in the University of Glasgow, for the high degree of collaboration and mutual understanding which we have been able to achieve.

To all those officials, technical and administrative, of the Scottish Development Department, the County Councils of Midlothian and West Lothian, and the New Town Corporation, we extend our warmest gratitude for their unstinting co-operation. In addition, to the large number of people who contributed in various ways, and particularly to those in the Working Parties and special Committees, we extend our warmest thanks. We also wish to mention especially the excellent work of our adviser on Utility Services, Mr. J.C. Wylie, and of S.P.A.L.D.A., who very

kindly prepared a report for us on Reclamation of Upland Farms. Special thanks are given to Midlothian County Council and its staff for the interim publication of **this Report**.

We also take the opportunity of thanking the members of our Planning Research Unit in which the Plan was prepared. This has consisted of an inter-disciplinary team of experts, who have given us all and more than we could expect in a new task of great complexity. We hope they will have the satisfaction of seeing some, if not all, our hopes come true.

Robert H. Matthew

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Chapter 1. PREAMBLE

A Statement on the Physical Aspects of the Regional Survey and Plan

INTRODUCTION

Volume Two covers the Physical Survey and Plan within the context of the economic study set out in the previous Volume. The specific terms of reference stated that the Physical Survey was to cover "an examination of the physical possibilities of the Area including the potentiality of the land for different uses, the degree of expansion of which the different towns and villages are capable, the problem of derelict land and land damaged by mining subsidence and the problem of redevelopment in existing built-up areas".

In carrying out our study in accordance with the terms of reference, there were a number of important factors which affected it in various ways.

First, the Government has a special planning interest in the Area, and this was clearly brought out by the publication of the White Paper entitled 'Central Scotland: A Programme for Development and Growth', in November, 1963, approximately a year after the Regional Survey and Plan was commissioned. Before it was commissioned, however, the Government had already encouraged the establishment of the large British Motor Corporation Factory in this Area, and more recently had published a Designation Order (1962) for the New Town of Livingston, in the heart of the Survey Area, and of fundamental importance to it. There were also important proposals for modernising the infrastructure. For instance, plans were well advanced for the improvement of the main Glasgow/Edinburgh road (A8) to motorway standard within the Area, while construction of the new Forth Road Bridge, a few miles to the north-east, was in progress.

Second, the Livingston New Town Corporation had already been appointed and its technical staff were commencing work on the urgent tasks of the preparation of their Master Plan.

Third, the two County Councils of Midlothian and West Lothian had a large number of proposals affecting the Survey Area. In fact, all these proposals had become so complicated and inter-related that, during the study, a number of Working Parties were initiated to assist in their co-ordination among the many agencies involved. The efforts of these Working Parties, although inevitably causing some delay in the completion of the study, were of very great benefit to it.

Our study therefore was carried out not in a static situation to which the normal techniques of survey, analysis and plan could be applied, but where planning decisions had already been made, or were contemplated, which would cause fundamental changes in the physical pattern. Indeed, it is a great tribute to the enthusiasm and goodwill of all concerned, and particularly to the technical officers in the Government, the two County Councils, and the New Town Corporation, that the whole operation of planning and essential interim implementation has been able to proceed simultaneously. In addition, as our physical proposals were developed, they were considered at various stages by the respective Working Parties by informal consultation with representatives of the various agencies concerned, and in a co-ordinating way by the Technical Committee for presentation to the Joint Planning Advisory Committee.

Within this complex framework, the physical planning Consultants were primarily engaged in basic survey and analysis work in the Area during the first phase of their study. This work entailed the collection and collation of a vast amount of survey data and material. The process continued by establishing:

- 1 the physical limitations to development in the Area;
- 2 the limitations imposed upon development by utility services and communications;
- 3 the determination of population target estimates and size of settlements;
- 4 the regional implications of the New Town of Livingston.

By a joint study with the economic planning team in Glasgow, an estimate of the development potential of the Area was established, so that target population figures could be worked out for both the New Town and the Area. Once target population figures had been established, it became possible to relate these figures more precisely to the physical conditions so that the Regional Plan could be evolved.

The Plan did not suddenly materialise, but was a growing, changing pattern throughout the course of studies, and does not represent the only possible solution. It represents what the Consultants feel to be the most desirable way in which the Area could expand within the period and to the population sizes nominated. The target for 1985 does not, and should not, represent the ultimate limits for possible expansion. As will be seen in the detailed proposals, it is suggested that some Town Groups should not grow beyond the target populations stated in this Report; in other cases, the target population figures for 1985 may be exceeded by further expansion in the post-1985 period.

In addition to this process, a detailed study of industrial dereliction throughout the Area was undertaken, and comprehensive proposals for a new regional landscape pattern are included, which would combine the functional needs of recreation with those of agriculture, forestry and other land uses.

FACTS FROM THE PHYSICAL SURVEY

We now give a brief outline of the main facts which emerged from the Survey.

Location and Relief

The Area is located within the Midland Valley of the Central Scottish Lowlands, and covers one hundred and thirty-three square miles. The relief of the land is largely in the form of a saucer-shaped basin valley of the Almond River, which flows through the Area from south-west to north-east.

On the west, the land rises to the bleak Slamannan plateau which separates the East and West Lowlands, while on the east, the pleasant, well-wooded countryside merges into Edinburgh's attractive green belt. On the north, are the Bathgate Hills, while on the south, the land rises rapidly from the Almond Valley to the Pentland Hills, which are over fifteen hundred feet in places.

Only six and a half miles to the north-east is the capital city of Edinburgh, while twenty miles to the west is the city of Glasgow and the Clyde Valley conurbation. The area immediately south of the Pentland Hills is one of the least inhabited in Britain. Two and a half miles to the north is the Firth of Forth and the new Growth Area of Grangemouth/Falkirk with its growing port facilities. Across the estuary and connected by both rail and road bridges, is Fife, containing the large Growth Area of Central Fife.

Geology

Subterranean resources have been one of the main reasons for this study, because much of the Area has been marred by bings and tips of over two hundred million tons of coal and oil shale wastes. Apart from this man-made disfigurement, the surface soil is fairly good.

Climate

The climate of the Area is generally mild, but has slightly greater extremes than the eastern or western coastlines of Scotland. The rainfall, too, is higher, owing to altitude, but persistent fog is infrequent. The high land on the west and south suffers from wind and exposure.

Historic, Architectural and Scientific Interests

The Area contains few outstanding examples of historic, architectural or scientific interest. As part of the Central Lowland Valley of Scotland, it was crossed by routes connecting the important historic centres of population on the east and west. Although there are remains from all periods from Neolithic times, there are few of national importance.

There are, however, Neolithic remains on Cairnpapple Hill, signs of Roman occupation at Castle Greg, and the mediaeval castles of Niddry and Cairns. There are also a number of fine seventeenth and eighteenth century houses, notably Houston House, Newliston House (designed by Robert Adam), and the semi-ruined Balbardie House (also from a design by Robert Adam). Stone from the Binny Quarry was used in the construction of Edinburgh's New Town. Mary Queen of Scots stayed at Niddry Castle in 1568, and John Knox officiated at the first communion after the Reformation, at Calder House. Sir James Simpson, the discoverer of chloroform, was born in Bathgate in 1811, and Dr. James Young discovered a method of extracting oil from shale in 1850 at Boghead, near Bathgate. Dr. Livingston, the explorer, laid the foundation stone for the Addiewell Oil Works in 1864.

Scientific interest in the Area is mainly floral and faunal. In the Pentlands, near Cobbinshaw, there are a few plants of the rare species *Trientalis europea*, and Scotland's rarest plant *Saxifraga hirculus*. There is also a wide selection of imported plants in the grounds of Carlowrie Castle. Cobbinshaw and Harperrig Reservoirs attract a large variety of wildfowl.

Agriculture

The major land use is agriculture, mainly in crops, cattle, dairying and hill-sheep farming. Hill-sheep farming predominates above the eight hundred foot contour and covers approximately thirty one per cent of the whole Area.

Forestry

Although most of the Area was once covered by woodland, only five per cent now supports tree growth. There is a network of shelter-belts south-east of West Calder and south of Kirknewton, which both protect agricultural fields and produce a timber crop.

Mining and Subsidence

The effects of mining can be seen throughout the Area. Shale oil was extracted from the eastern part of the Area, and refined at Addiewell, Pumpherston and elsewhere, but production ceased in 1962, leaving millions of tons of waste shale to disfigure the landscape. Areas liable to subsidence are shown on Map 6.3. Fireclay is worked principally at Armadale where it is used by a local industry. Subsidence from these workings is not serious.

Rehabilitation and Conservation

One of the main objectives of the Survey was to examine the areas of industrial dereliction created over the last hundred and fifty years by extractive industries. The entire Area was examined and the individual items were recorded and photographed. When plotted, the areas of maximum dereliction became apparent. On the east of the Area, the main problems which emerged were the gigantic mounds of spent shale. These are flat-topped and irregular in outline, and some are over two hundred feet high. They are often in prominent positions and dominate the landscape; in some cases they have a remarkably dramatic quality for the visitor.

The coal bings are mainly in the west of the Area and are numerous and widely distributed. They are usually conical in shape, and, although on a smaller scale than the shale bings, are more unsightly; those still burning pollute both atmosphere and streams.

Population and Housing

The population, which has been suffering from emigration, has recently shown signs of recovery as new industries and overspill families have entered the Area. One effect of past migration is reflected in the age structure, which contains slightly fewer elderly people than the general average in Scotland.

The majority of housing in the Area has been of the single-storey mining cottage type. More recently, public authorities have developed an active programme of low cost housing; but there is no surplus of habitable dwellings to accommodate incoming population.

In general, there is a lack of middle and upper-income dwellings throughout the Area, although recently there has been some middle-income building activity at Bathgate, Uphall and the Calders.

Industry

In the past, the main industries of the Area have been extractive, but for a number of years these have been in decline, with the oil shale industry closing down in 1962. Recently, a number of new industries have come into the Area, the most spectacular being the British Motor Corporation at Bathgate, employing some four and a half thousand workers. A number of firms with their headquarters in Edinburgh have set up new factories in the Area. There is a government-sponsored Advance Factory at Whitburn, and another proposed at Polbeth. A number of other industrial sites have been approved at Newbridge, Addiewell and Blackburn.

Community Services

Community Services in the Area have been considered in four parts:

Education Facilities. The existing secondary and primary school provision in the Area is adequate for the present population, although several of the school buildings are out of date and need replacing. Both County Education Authorities had planned for major re-organisation of school facilities prior to the designation of the New Town. A Technical College is nearing completion at Bathgate for one hundred and fifty full-time and eight hundred and sixty part-time students, to meet the existing needs of the Area. The nearest university to the Area is only six miles away in Edinburgh; the Heriot Watt College is also to have university status. Glasgow, twenty miles to the west, has now two universities, and recently a new university was agreed for Stirling, eighteen miles to the north-west. The needs of adult education are normally centred within the existing secondary schools.

Health Facilities. There are three hospitals in the Area, including Bangour Hospital, which is one of the largest in south-east Scotland. To make more space available for its geriatric and mental hospital facilities, it had already been proposed to replace the General Hospital on another site. A wide range of health services serves the existing population. There are seventeen maternity and child welfare centres, and a school health service is in operation.

Shopping and Service Centres. The distribution of town and shopping centres in the Area in many instances has been closely associated with mining pit heads. With the decline of extractive industries, many marginal shops have been forced to close. But where new industries have developed and urban growth has occurred, shopping and service facilities are improving. The Area's centres have been classified into three groups: Regional, Small Town and Village.

1 Regional Centre. The regional centre is Bathgate with a total of forty-five per cent of the shopping floor space and twenty-five per cent of the retail trade of the Area. The centre does not provide for vehicle and pedestrian separation, is lacking in car-parking facilities and requires considerable redevelopment.

2 Small Town Centres. There are seven such centres in the Area. Shops in these centres have on average two hundred and fifty square feet of sales area, and are mostly spread out along main roads, as at Whitburn and Broxburn/Uphall.

3 Village Centres. There are twenty-one village centres with an average of five shops of about two hundred square feet of sales area each.

In 1961, the Area lost about twenty-eight per cent of its retail trade to centres outside the Area. As about forty-eight per cent of the consumers' retail spending is on food, the role of the Small Town and Village Centres is clearly to provide essential goods only.

Other Community Facilities. Other Community Facilities, such as churches, halls and clubs, raise no exceptional problems.

Churches provide many of the social facilities, and there is a great deal of social activity of all kinds in the Area. Facilities vary considerably but are generally inadequate for the existing population.

Utility Services

The Utility Services were studied in four parts:

Electricity. We have been informed that the disposition of the grid system relative to the Area can supply sufficient power to cater for an increase in population of two hundred thousand. There are likely to be amenity problems in relation to overhead cables outside the Designated Area of the New Town.

Gas. The existing gas super-grid, which runs east/west along the northern boundary of the Area, is understood to be adequate for the needs of the New Town and adjacent urban development, but several of the smaller communities have either an inadequate service or none at all.

Water. A great deal has been done in recent times to improve the water supply in the Area, including the construction of an integrated system of reservoirs, water storage tanks, and water mains. This service is capable of supplying the Area until 1967, but serious difficulties would arise from that date. In 1961 the Government initiated a study of the possibility of using Loch Lomond as a source of water supply for Central Scotland. This scheme, which is expected to come into operation in 1967, will be able to meet all the water needs of the Area in the foreseeable future.

Sewerage. In general the sewerage system throughout the Survey Area is adequate for existing needs, except in the villages along the Breich Valley. A number of villages in the Area continue to use septic tanks which may endanger public health and pollute rivers. Major development in the Area would necessitate the expansion of some of the existing services and the provision of new ones.

Communications

It is important, when considering the existing pattern of communications, to appreciate that it has been conditioned by the requirements of the past rather than those of the future.

Railway Services. The Area has an extensive rail system but the lines are rarely related to each other. The line passing through the centre of the Area handles only freight traffic.

Bus Services. There is a network of existing services over the whole Area, and these can be expanded without difficulty.

Port Facilities. The three Central Scotland Ports of Glasgow, Leith and Grangemouth are all accessible, with the last having the advantage of proximity, but lacking a good road connection to the Area.

Air Facilities. The three existing airports in Central Scotland of Edinburgh (Turnhouse), Glasgow (Renfrew) and Prestwick are all accessible. Turnhouse is located near the north-eastern boundary of the Area, and is likely to expand in the near future; a new airport to replace Renfrew is being built at Abbotsinch to serve Glasgow; and Prestwick, the International Airport, although not far distant, has recently been modernised.

Roads. There are four east/west roads passing through the Area; the most important is the main Edinburgh-Glasgow road (A8). It is heavily overloaded, but plans are well advanced for providing a

new motorway through the Area. The Edinburgh-Stirling road (A9) is also heavily overloaded. Less important are A71 from Edinburgh through the Calder, and A70 from Edinburgh along the northern slopes of the Pentland Hills. The main north/south road (A706) passes through the western part of the Area, and is nearing capacity over part of its length. Almost all existing road junctions are sub-standard.

A combination of increased car usage and a decrease in rail services has already caused congestion on the roads, and town centres have suffered from traffic congestion at peak hours.

Although extensive improvements of main roads are necessary to meet present needs, any major new urban development in the Area would necessitate a basic reconsideration of the total road pattern.

Recreation

Recreation facilities within the Area fall far below accepted standards. They are restricted mainly to football pitches, but, for climatic reasons, these are often unusable for part of the season.

Fishing was once a popular sport of the Area, but owing to extensive industrial pollution, is now restricted to a few streams and the reservoirs.

Wide areas of natural landscape amenity, eminently suitable for recreational activities such as walking, pony-trekking and adventure training, abound in the Pentland and Bathgate Hills. The Union Canal is not used for recreational purposes but could be exploited with advantage.

Recently, planning permission has been given for the construction of a motor racing circuit to international standards at Polkemmet. At Ingliston, there are facilities for go-kart racing and horse-jumping.

Urban Settlements

Many of the urban settlements have been dominated by extractive industries and are fairly typical of British mining communities in having poor quality housing, a low standard of community facilities and an unplanned muddle of urban land uses. The largest town is Bathgate, which has been for many years the main market centre for the Area. It has a number of industrial installations, including the large new British Motor Corporation factory. There is visible evidence of new growth and vitality in Bathgate. In the north-east is Broxburn/Uphall, consisting of ribbon development along the old Edinburgh/Glasgow road. This road was re-aligned south of the town some time ago. The town offers varied employment opportunities, including service employment at the nearby Bangour Hospital.

Along the valleys of the River Almond and the Breich Water is a series of settlements linked by the A71. Going from east to west, East Calder and Midcalder remain predominantly rural. Polbeth is a post-war residential dormitory, while West Calder has an old centre in process of renewal. Addiewell and Stoneyburn are mining settlements adversely affected by bings and mining subsidence, while at the head of the Breich Water valley is Fauldhouse, another mining settlement located on high and exposed ground.

North of these settlements is another series along the A705, from Livingston Village in the east to Harthill on the boundary of the Area in the west. Of these, Blackburn and Whitburn have extensive new public housing. At Whitburn, however, further development is limited by land liable to mining subsidence.

THE ECONOMIC STUDY : SUMMARY AND IMPLICATIONS

1 Summary

Volume One of the Lothians Regional Survey and Plan, prepared by the Regional Consultant, Professor D. J. Robertson, and his colleagues at Glasgow University, deals with the economic and social aspects of the Plan. Volume One has two sections: Part I contains sixteen detailed studies dealing with the survey and analysis, including forecasts and recommendations for their respective economic and social aspects; Part II, A Policy for the Lothians, contains conclusions and recommendations. The Physical Planners have taken full cognizance of the contents of Volume One, without which it would have been impossible to prepare Volume Two, the Advisory Plans for the towns, and the Advisory Master Plan for the Lothians Region. This summary deals with Part I and the following section gives a brief account of some of the principal recommendations of Part II.

A Geographical and Historical Perspective

The Survey Area's character is largely the result of prosperous mining activities in the last century, producing industrial dereliction and many sub-standard houses in the twentieth century. Few typical farming communities remain and, in spite of the extensive agricultural hinterland, even small settlements look like industrial towns. The Area's favourable location in centres of economic activity in Central Scotland is emphasized by the network of communications which carried its mineral wealth to markets beyond its boundaries. As mining activities declined, these same communication links with Edinburgh, Falkirk and Glasgow encouraged the local population to depend upon services beyond the Area which consequently suffers from a dearth of social and economic facilities. The locational advantages and the accessibility of the Area were primary factors influencing its selection for the New Town of Livingston.

Population

The Survey Area's total population at the 1951 Census was 74,149, increasing by 4.9% to 77,785 at the Census of 1961, Bathgate being the only small burgh to show a net immigration in this period. Estimates of net emigration for the landward areas of the two counties within the Survey Area between 1951 and 1961 were West Lothian 5.91%, Midlothian 12.68%. The suggested effect of migration during this period, on the age structure of the three small burghs is a net gain of people aged between thirty-five and fifty-five and of children between ten and fourteen, with a net loss at all other ages. There are no striking differences of population structure between that for Scotland and that for the Survey Area, the latter having 49.6% males and 50.4% females. The average 1960-62 standardised death rate for the Survey Area was 11.2 per thousand (12.1 for Scotland); and the average standardised birth rate per thousand was 19.0 (19.6 for Scotland). In 1961, 32% of the Area's total population lived within the administrative boundaries of Armadale, Bathgate and Whitburn. To facilitate the work of the Physical Planners, the Survey Area out-with the Livingston Designated Area has been divided in this Chapter into 'planning areas' formed by amalgamating County Council Electoral Districts; and estimates have also been made for the increase of population since 1961. Chapter 4 considers the number of school places, the size and structure of the working population and the rate of household formation implied by population projections made in Chapter 3.

Industry and Employment

Employment in manufacturing industries has prospects of increasing, particularly in firms new to the Area; this increase, however, is

not likely to be substantially greater than the expected decline in primary employment. Employment in service industries has been increasing substantially. There is adequate land for industries attracted to the Area, but the problem of attracting industry to the Area involves improving the infrastructures as well as offering financial inducements including financial assistance in training labour.

Regional Problems and the Policy of Attracting Industry to the Peripheral Regions of Britain.

Chapter 6 defines the peripheral regions as areas which for many years have had "higher rates of unemployment and of net emigration, slower growth of output and lower levels of income per head than the midland and southern regions", and the 'regional problem' as the extent and the persistence of these differences. It further discusses "the factors determining whether firms move to or set up branches in new locations", "the British Government's policy on the location of industry since 1945", and "criticisms of existing policy and suggestions for additional measures".

Aspects of Commercial Employment

Chapter 7 examines the likely, possible and desirable development of employment in the service industries in the Survey Area. Service industries are broadly defined and the number of insured employees in service employment, in 1961 are given for Great Britain, Scotland and the Survey Area as 12,284,250, 1,206,890 and 11,924 respectively. Three aspects of commercial employment are given; (i) the structure of the labour force; (ii) the organisational structure; and (iii) the locational requirements of commercial offices. The desirable attributes of a potential office location are classified as suitable buildings, satisfactory rent levels, adequate car parking and a choice of location within the same general area; availability of a number of services and a whole range of communications; adequate supply of trained labour and interlinkage. The Government's policy on commercial employment is carefully examined.

The Regional Labour Market

An established pattern of local labour markets exists in the Area, so adapted to the current situation as to achieve a reasonable though not necessarily ideal balance of employment. The existence of this balance is a consequence of labour mobility. The nature of employment balance in markets is clarified, and the part played in this process by the daily journey to work analysed. The current travel to work patterns are examined, and the existing nature of inter-market relationships assessed.

Glasgow and the Lothians

Despite the magnitude of the overspill programme, the effect upon Glasgow's remaining population is expected to be minimal, the high birth and death rates of the city's population being balanced by the migration of younger age groups. High unemployment in Glasgow makes the overspill of its industry an unreasonable measure. The scale of the overspill programme into the Survey Area will therefore be dependent upon attracting non-Glasgow firms to employ them.

Edinburgh and the Lothians.

The growth of Edinburgh is having important repercussions on its environs: the 1961 Census indicated that fourteen thousand left the city in the previous ten years, many moving only a short distance from the city. By 1963 only 384 acres of land remained in the city for private development; in 1957, 923 acres were available. These

figures suggest that Edinburgh will shortly require an 'overspill' of houses. Industrial land is in short supply until sites are brought into use after they have been reclaimed from the sea or freed from dangers of subsidence. Since 1951, employment in Edinburgh has remained relatively constant. Industry is moving out of the city but growth opportunities for offices and shopping are good if the inhibiting effect of increasing traffic congestion is removed.

Shopping Provision

Chapter 11 attempts to establish the appropriate provision of shopping in the Survey Area and to assess the opportunities of fostering policy objectives. Since there is a relationship between population distribution and shopping facilities, this Chapter is concerned mainly with principles, trends and general recommendations.

Transport

Chapter 12 deals comprehensively with transportation and the various routes and systems serving the Survey Area. It contains valuable information on volumes of freight and passenger traffic carried by British Railways, road improvements and current programmes, together with statistics on traffic volumes for the more important roads in the Survey Area, A705 and A71, and the inadequacy of north/south routes to Grangemouth/Falkirk and to Lanark and Carlisle; bus services centred on Bathgate and Broxburn and other routes traversing the Area; Scottish Omnibuses' expansion potential to serve regional growth; road goods services and B. R. S. depot at Bathgate; numbers of licensed vehicles in the Area and numbers of vehicles per thousand population for 1961: (West Lothian, 116; Midlothian, 137; Scotland, 141 and Great Britain, 193); port facilities, with reference to Chapter 13, Volume One of this Report which deals specifically with this aspect; air services and inadequacy of Edinburgh/Midland routes.

Port Facilities

Chapter 13 discusses the relative importance of port facilities and their influence upon the Survey Area. The Area has unique advantages of convenient proximity to world-wide trade from the Clyde, and European trade from the Forth, through the ports of Grangemouth and Leith. There is, however, great dependence on English ports which handle two-thirds of Scotland's total exports. Leith tends to specialise in handling fertilisers and wood pulp, with Grangemouth handling chemicals. The yearly tonnage handled by Glasgow was eight million, Grangemouth four million, Leith 1.4 million, compared with that of seventy-six million for Rotterdam, the largest port in the world. Importance of ports generally depends upon speed and cheapness of dealing with goods. These are affected by three facilities: inland transport, handling and shipping service; facilities for handling goods in containers, the super carriers and tankers of one hundred thousand tons and above, and free flow road and good railway connections for lorries and wagons. Glasgow, though most suitable for handling goods from the Survey Area in competition with English port facilities, has inadequate railway connections. Leith having good location and facilities for handling trade to continental Europe has inadequate and often congested access roads, though railway connections are good. Grangemouth has the best location to serve the Area, though access by road and rail is indirect.

Public Investment

Chapter 14 discusses the role of public investment as an economic growth factor. It gives details of investment requirements by sectors; for housing and transport, the two most important sources; education,

medical services, General Post Office and power supplies; national government offices and regional offices. Employment in the public sector is discussed and statistics given for various occupations in relation to total population. An Appendix to Chapter 14 attempts to estimate the capital cost of housing and servicing a population of 100,000 in Livingston New Town at current prices, excluding industrial and commercial development financed mainly by private enterprise. It estimates that a sum in the region of £130,000 will be required for the main services excluding the cost of the New Town centre. A detailed account is given of cost estimates for Housing (approximately sixty-two million pounds); Education (eleven million); Community Services (twelve million); Recreation Facilities (one and a half million); Engineering Services (seventeen million); and Communications (twenty-six million).

Housing and Building

Chapter 15 is concerned mainly with development proposals and their implementation and questions the building industries' ability to cope with a massive construction programme. The objectives and implementation of an ideal housing policy are also discussed. The survey data examined includes: house building rates in New Towns; characteristics of the building industry and its resistance to change; barriers to increased productivity; shortages of traditional building skills, supply and increasing cost of materials, dislocation by inclement weather; increasing mechanisation and industrialisation and effects upon building costs; employment patterns; organisation problems; production and design; cost control; modular co-ordination and phasing of housebuilding. The section dealing with housing policy includes details of distribution of housing; local authority and private ownership; scope for private housing; rent policy and the allocation of houses.

East Kilbride: Estate Management and Industrial Growth

Chapter 16 draws conclusions from a study of Estate Management and Industrial Growth in East Kilbride, the oldest of Scotland's post war New Towns. It gives details of the housing deficit, of how this occurs and the means adopted for reducing it. Rent structure and rent adjustment are covered and references are made to house ownership. The town's economic viability is examined in relation to social benefits, increasing land and the rateable values which affect its financial strength and borrowing potential. Very approximately, the developed land is now worth ten times the original acquisition costs. The town's total rateable value in 1962 was a little higher than Dumbarton and Inverness which then had similar sized populations. Tenant selection was generally determined by employment opportunities and 'overspilling' authority's policies. Houses for private ownership have been in demand. The Chapter further discusses industrial rates of growth and unbalance; the high proportions of non-manufacturing trades; labour participation; female labour; youth and employment; commuting and transport costs.

Some Social Problems

Chapter 17 has the objective of identifying the social characteristics and needs of Livingston New Town and its surrounding region. One field study was concerned with the present population in the smaller communities; another with overspill families from Glasgow now living in the area. The Chapter discusses community life, and local attitudes to travel, work and newcomers. It traces the influence of industrial development and resulting urban environment upon the communities, and discusses fully the many trials and tribulations faced by new families and older residents.

2 Implications of the Economic Study

Each of the studies in Part I of Volume One makes a number of recommendations. These are taken up and combined with further recommendations in the connected account of the economic and social aspects provided in the Report in Part II - A Policy for the Lothians - written by Professor Robertson. This section in the present Volume is not intended to do more than give a brief indication of some of the salient features of these proposals. The teams from the two Universities worked closely together and a large number of problems and decisions affecting both studies were arrived at in discussion.

Volume One emphasises the following points among others:-

- a The Survey Area can be regarded on economic grounds as a sensible choice for a 'growth area'.
- b The development of the Area will require continuing favourable attention from the Government and implies:-
 - i a continuing policy designed to secure national economic growth,
 - ii continuing administrative attention,
 - iii consideration of the case for location of Government employment in the Area,
 - iv a determination to encourage the timeous provision of social investment - educational establishments, hospitals, post offices, etc.,
 - v further improvements in 'inducements' policy designed to attract industries to development districts, including grants payable during the first few years of a new enterprise,
 - vi further restraints on development in the South East of England,
 - vii a stronger policy on office relocation.
- c The employment needed for growth will require to be imported or may come from Edinburgh. Very little can be expected from Glasgow. Attention should be given to the development of non-manufacturing employment.
- d The Area will have a better chance of economic growth if it is focused on Livingston which should be come 'Greater Livingston' with a target population by 1986 of 185,000. Such a community will develop service employment and is less likely to be dwarfed in its economic and social life by Edinburgh.
- e This implies changes in the local government structure of the Area and in the role of Livingston Development Corporation.
- f The target for the Area as a whole by 1986 should be 230,000 but natural increase is likely to ensure continued growth beyond that date.
- g The communication network should be designed to facilitate any movement between Greater Livingston and Edinburgh. A rail service to Edinburgh is needed.
- h The Area should function as one labour market. The location of industry and communications within the Area should reflect this.

- i The shopping and service centre of the Area should be the centre of Livingston. Shopping facilities in Bathgate should not be extended.
- j The larger scale of the population proposals should permit a more flexible policy on immigration than that implied in the Designation Order for Livingston. Edinburgh may shortly begin to overspill population to the Area.
- k The scheme by which overspill from Glasgow is administered should be revised.
- l The scale of development proposed for the Area is fully warranted by the extent of the problems of growth and redevelopment of Central Scotland as a whole.
- m The Area will be a better place and have better prospects of economic development if a planned programme of rehabilitation is undertaken. This will require continuing administrative arrangements.
- n It is important to aim at a rapid pace in the development of the Area. A programme of 1,900 houses a year is envisaged. This is likely to require industrialised building methods and the help of the Scottish Special Housing Association.
- o Special efforts should be made to develop high-quality houses for sale and to attract middle-income and professional residents.

POSSIBILITIES FOR EXPANSION

One of our principal tasks was to examine the Area with a view to its possibilities for urban expansion. The process by which this was undertaken is outlined below, but briefly the physical limitations of the Area in terms of land uses and conditions were first examined by means of a series of sieve maps. Then a further series of limitations imposed by Utility Services and Communications was examined, and from all these conditioning factors, the expansion possibilities emerged.

Physical Limitations to Development in the Area

Chapters 2, 4, 5, 6 and 7 deal with the physical and geographical nature of the Area. It is intended to present here some of the implications of these Chapters to indicate how physical limitations have influenced planning proposals.

Surveys of the following physical features were recorded on a set of sieve maps:

- 1 Woodlands.
- 2 High quality agricultural land.
- 3 Waterways.
- 4 Peat moss, bogs and areas of bad drainage.
- 5 Bings, quarries and sites of industrial dereliction.
- 6 North facing slopes, severe gradients and land above the six hundred and fifty foot contour.
- 7 Areas liable to subsidence in three grades:
 - a unsuitable for any structure.
 - b areas where light structures may be possible after detailed investigations.
 - c areas suitable for light structures only.
- 8 Land already developed.

After an analysis of these sieve maps, the land most suitable for building was graded into two classes: first class building land which was not affected by any of the restrictions listed above, and second class building land which was affected by only one of the major restrictions, with the exception of 7a. Most of the first class building land lies in the eastern section of the Region; this area is referred to in Volume One, Part II as 'Greater Livingston'.

Limitations Imposed upon Development by Utility Services and Communications

The provision of utility services and communications is fully discussed in Chapters 11 and 12 of this Report and the main aspects arising out of the provision of these services has been under the constant review of the Services Working Party. The following notes give a brief summary of the major aspects of each service.

Water Supply. There should be no shortage for the planned expansion of population and industry, if water from Loch Lomond is brought to the Region by 1967.

Electricity. Supply authorities are aware of the anticipated regional growth and have given assurances that demands can be met from the Super-Grid network.

Gas. The high pressure gas Super-Grid pipeline runs to the north of the Area and already supplies Bathgate and the B.M.C. plant. The New Town and its industries will be connected to the Super-Grid and supply authorities envisage no difficulties in meeting the increased demand. Gas supply in a number of existing towns is provided by an old distribution grid which is heavily overloaded. Several small towns do not have gas and it is considered unnecessary to provide new installations to service these, where the population growth is insufficient to warrant it. The gas supply system in the Area should be reviewed.

Sewage and Refuse. The Area has no comprehensive sewage disposal system, the majority of towns rely on local sewage treatment works. Anticipated increases in the regional population will require the provision of extensive new sewage treatment plants which should be designed to treat both sewerage and refuse for conversion into compost. A market for this compost will certainly be assured if production is co-ordinated with landscape rehabilitation proposals. Following the recommendations for the distribution of population, three sites for sewage and refuse disposal plants have been nominated. Problems of surface drainage and disposal of sewerage and industrial effluent into the Area's waterways can be resolved satisfactorily without resort to exceptional measures.

Communications. Existing and proposed communications in the Area are dealt with fully in Chapter 12. While development of the Region requires an extensive programme of expansion in all communications (roads, bus services, road transport facilities, railways, airport facilities and port facilities), it is well supplied at present, and no unusual local circumstances prevail which would make the expansion of these essential facilities more difficult or more costly than elsewhere in Scotland. Consideration has been given to the anticipated increase in private car ownership, and the road network proposed in the Advisory Master Plan for the Lothians Region provides adequately for national, regional and local needs.

DETERMINATION OF POPULATION TARGET ESTIMATES AND SIZE OF SETTLEMENTS

In proposing the 1985 target population figures for each Town Group, two major principles for the Region's future development were

considered:

- 1 That the focus of the Region would be the New Town of Livingston, and that, while the Survey Area has more recently become a 'Growth Area', the key growth factor must continue to be the New Town.
- 2 That although the remit to the regional planning Consultants was largely a matter of presenting advisory proposals for the redevelopment and rehabilitation of the New Town's surrounding region, the proposals made for the Survey Area and its towns are aimed at co-ordinating their future growth with that of the New Town to create 'Greater Livingston' as an urban and regional environment which would help foster the future growth and success of both New Town and Region.

Within the bounds of the remit and following from the preliminary surveys which established that the most desirable and largest portion of the 'buildable land' was within the New Town's Designated Area, it was suggested that the population target of the New Town itself be raised from seventy thousand to one hundred thousand by 1985.

By considering such factors as proximity to the New Town, expansion potential (largely a matter of land availability), accessibility etc., the Area's towns were classified into three main types:

- 1 towns and settlements where expansion was not considered desirable;
- 2 towns where expansion should be limited to infilling and rounding off;
- 3 towns which were capable of considerable expansion.

A detailed statement on each Town Group is contained in Chapter 14.

The land availability survey showed that the towns of Broxburn/Uphall, the Calder, Polbeth and Blackburn could be considerably expanded. Whitburn and Armadale had severe restrictions upon their growth potential due to subsidence problems on adjacent land; Fauldhouse, Addiewell and Stoneymark had very limited expansion potential for a variety of reasons; and Bathgate should be limited to a population of about twenty two thousand five hundred.

With these broad principles in mind, the Region's utility services, communications, distribution of industrial land, landscape quality etc., were further studied before more detailed proposals were made. Bathgate, Armadale, Whitburn and Blackburn, which are closely related to each other, were found to group around an area very suitable for industrial purposes with the B.M.C. factory well established at its centre. When the proposed interchanges between M8, A8 and A706 are constructed nearby, this area's potential for industrial expansion is expected to be fully realised and it will become the major industrial zone in the west of the Region.

North-east of the New Town, where the survey has revealed an extensive area of good building land, it is proposed that there should be large scale expansion in the Broxburn-Uphall-Winchburgh district. This area is well located in relation to Edinburgh and the Newbridge intersection of the M9, M8 and Forth Road Bridge connections, and offers scope for middle-income housing development. The build-up of population in this area will attract community facilities, and will emphasise the need to rehabilitate the Pumpherston and Broxburn bings. The visual improvement of this area is essential if the eastern approaches to the New Town from Edinburgh and Turnhouse Airport are to be made attractive.

The two southern Town Groups of Mid and East Calder, and Polbeth and West Calder are close to the New Town and offer scope for expansion. Their general landscape setting and quality is high. These Town Groups are closely related to the southern sector of the New Town, and a third major industrial complex is proposed in this part of the Region. The development of this area is based upon the proposed new major road parallel to the existing A71 from Edinburgh to the Calders.

The other two Town Groups are Fauldhouse and Addiewell-Stoneyburn, where we are proposing infilling and rounding off. The small expansion in population proposed for these towns is largely based on the principle of creating sufficient growth to support adequate social facilities and to ensure an improvement in environment.

These were the general proposals for development which evolved out of the analysis of survey data, and helped to establish the 1985 target population figures. These proposals for large scale expansion in settlements adjacent to the New Town are aimed at creating the new Greater Livingston Area. There are no reasonable grounds for suggesting that any one town's population should vary much beyond the figures we have proposed. An analysis of the physical conditions prevailing within and around each town has suggested the upper desirable limits of population expansion. The figures which are proposed for 1985 have evolved out of a joint consideration of general economic recommendations and detailed physical survey and analysis procedure.

THE REGIONAL IMPLICATIONS OF THE NEW TOWN OF LIVINGSTON

Paragraphs 28-32 of the 'New Town Designation Order' foreshadowed the idea of the Growth Area which was outlined later in the White Paper, 'A Programme for Development and Growth for Central Scotland'. Emphasis was given to co-ordinated growth between the New Town and its Region, and to rehabilitation and redevelopment. The acceptance of these ideas and their meaning in economic terms has been fully discussed in Volume One of this Report (see Volume One, Part II, Section II, 'The Background').

The Region contains a recently designated New Town (New Towns' Act 1946) and three small towns (Whitburn, Blackburn and Polbeth) which had previously signed 'overspill agreements' under the Town Development Act (with Glasgow City Corporation).

The factor which has dominated all our proposals was the Government's decision to locate a New Town at the heart of the Growth Area. Although the designation of Scotland's fourth New Town at Livingston - Great Britain's sixteenth - can be directly related to earlier proposals in the Clyde Valley Regional Plan, it occurred at an important time in the development of planning thought. Due to the many differences that exist between the earlier New Towns of Great Britain, it is sometimes too easy to classify them as Mark I and Mark II New Towns. The surrounding Area should be described, within the context of our proposals, as a New Town Mark II, or as a Regional City. This differentiation between New Towns is not dependent upon their design content or their average residential densities, but upon the planning principles which underlie their initial designations, and their regional role and framework.

In this Chapter, the relationship between the New Town of Livingston and its surrounding Region - the Region with which this Report is concerned - is discussed in broad terms. We acknowledge that some of the issues raised have more than regional importance, and that many of these are beyond the scope of our remit as regional Consultants. It is necessary that these be mentioned here, since the principles and policies which have been adopted in the preparation of

this Report are important to a complete understanding of the Project.

In the original New Town Designation Order of 1962, it was suggested that the Livingston New Town should have a population of up to seventy thousand. The Consultants have recommended that this figure be increased to one hundred thousand by 1985. This figure, together with the Survey Area's existing population of over eighty thousand in 1963 and its own natural increase, indicates that by 1985 there would be a total of two hundred thousand people in the Survey Area without adding immigration to places within the Survey Area but outside the New Town.

Both New Town and Survey Area are near the city of Edinburgh and its airport at Turnhouse and the ports of Leith and Grangemouth on the Firth of Forth. Apart from some serious restrictions on development in the western section of the Survey Area, there are no foreseeable limits imposed by physical conditions, utility services or communications which would prevent the growth of the Survey Area's population from reaching the target of 230,000 which we recommend for 1985 (including immigrants to places outside the New Town) or would prevent further growth in the population of the Survey Area by natural increase in the years up to 2000 A.D. by which time the population would amount to nearly 300,000.

With these general factors in mind, the ultimate development of the Survey Area is conceived in terms of a new sub-regional city complex with the New Town of Livingston at its centre. This complex of urban growth would be separated from the city of Edinburgh by the existing and possibly extended green belt and would take its place in Central Scotland, alongside other designated growth areas such as Falkirk/Grangemouth, Cumbernauld New Town and the proposed new Lanarkshire Growth Area.

Planning considerations, particularly the availability of building land, have dictated that major urban expansion should occur in the eastern sector of the Survey Area and the majority of the immigrant population to the Region will therefore be accommodated there. The concept of 'Greater Livingston' (see Volume One) has thus evolved, resulting in the recommendation that areas of principal expansion and redevelopment should be closely linked with the New Town. The area recommended for the greatest expansion is Broxburn/Uphall, which will have the advantage of being linked ultimately with the M9 motorway and of providing development in a north/south direction, so counter-balancing the east/west emphasis of existing urban development generated by the lines of communication between Edinburgh and Glasgow.

To serve this major development, an extension of the New Town spine road is proposed to link with the M9 and this north/south emphasis is repeated in the western sector of the Region by the proposed duplication of the A706. This new road will provide a vital industrial link between the Survey Area and Carlisle in the south, and Falkirk/Grangemouth in the north.

Within the Survey Area, a close physical and functional linkage is proposed between the New Town and the existing towns. This linkage has many economic and physical advantages. The economic advantages are stated in Volume One of this Report; the physical advantages are outlined below:

- 1 By considering both New Town and surrounding Region together, it should become possible to co-ordinate the house building programme for the Area as a whole.
- 2 The New Town form of development is a well-proved method of providing for large-scale increases in both population and

cont. industry. It has weaknesses, however, when the New Town is required to be self-sufficient and balanced. Some of the weaknesses are given below, although many of these can be dealt with if both New Town and Region are designed to function together:

- a Due to large scale increases in New Town populations over a relatively short period, population age structure is frequently unsatisfactory. By developing a New Town in an established regional complex, the age structure imbalance can be offset by the existence and inter-relation of the already well established and balanced surrounding age structured population. The adoption of an overall regional immigration and house building policy makes it possible to house old people alongside young.
- b Past experience has shown that in providing the housing and employment for a New Town's growth, the social, shopping and recreation facilities are often neglected, slow to start and take a long time to mature. Planned integration between the New Town and existing regional towns, by the extension of existing bus routes, will allow the first New Town residents to use all the facilities already available in the Region.
- c New Town employment opportunities have tended to be heavily biased towards manufacturing industries and finding employment for the school-leaver is often difficult through the initial scarcity of office and other service employment. By instituting and adopting a regional industrial and employment dispersal policy (as has been pointed out in Volume One) the chances of establishing a balanced employment potential in both New Town and Region are immeasurably improved.
- d Many of the early New Towns are fast becoming 'regional' shopping centres, increasing their trade potential by drawing upon a much larger pool of consumers than those of the New Town itself. The construction of a major shopping centre within the New Town will, of its own accord, influence the redevelopment potential of each of the Region's existing towns, and this has been taken into account in preparing the balanced regional design.
- e The New Town's industries require middle and higher income housing for professional and executive personnel. Past experience with this type of housing within New Towns has generally been disappointing but a regional plan makes it possible to provide a variety of areas suitable for middle and higher income housing within the New Town and the surrounding Region.

3 By planning New Town and Region as one entity, the specialised facilities required by the total population of some two hundred and fifty thousand may be judiciously allocated for accessibility, convenience and safety. This factor is best illustrated by the proposals for landscape rehabilitation and the provision of recreation facilities. As with the population proposals, the initial emphasis on landscape rehabilitation has been concentrated on the sections near the New Town (see Map 7.4). The New Town's Central Area in the Almond River Valley, forms the focal point for a 'greenway' system which radiates throughout the Region linking recreation areas and serving the New Town and each urban community.

OTHER PROPOSALS IN THE PLAN

In addition to the foregoing study of urban expansion possibilities and implications in the Survey Area, this Report also contains a large number of proposals for areas not at present developed. Although the predominating interest was urban land use, other uses were given due consideration, both in their own right and as they affected the welfare of the urban population.

The problems of Industrial Dereliction and its Rehabilitation (Chapter 7 deals with these in detail) were the principal concern of this study. Since one of the most important objects of the physical study was to consider ways and means of dealing with this vast and intractable legacy, a careful site by site examination was made of all eyesores in the Region. Information was collected from other areas in the United Kingdom with similar problems, general principles were evolved and, for each case, remedial measures were prescribed, together with a phased plan of action. While the study was actually in progress, Landscape Consultants were appointed by West Lothian County Council for one of the largest eyesores. The New Town Corporation's Chief Architect and Planning Officer (himself a Landscape Architect) prepared plans for a second, while in the case of a very large bing complex which straddled both Counties and which would affect the amenities of the New Town area, another firm of Landscape Architectural Consultants was appointed jointly by the two County Councils.

The general policy of Rehabilitation proposed in this Report consists of a scheme for removal, in some cases, and remedial action, in others, and an examination of Chapter 7 will show how complicated this problem is. The phasing of the scheme is also important, as it is considered essential to deal most urgently with those eyesores which lie in proximity to the areas of most rapid population growth. Little is more likely to adversely affect the psychological atmosphere of the Lothians Growth Area than the continued existence of these prominent eyesores.

Combined with this bold policy of Rehabilitation, there are proposals for Agriculture, Forestry and Recreation, which amount to a complete regeneration of the whole landscape pattern. In the matter of Recreation needs, we are particularly indebted to the Recreation Committee whose members are acknowledged in the Introduction of this volume, and we have put forward a Regional Landscape Policy in Chapter 15, which, if implemented, could well bring to the twentieth century Scottish Landscape something of the quality which the great landowners and their landscape architects brought to the eighteenth.

Broadly, the proposals consider that Agriculture should be maintained at a high standard and improved where possible, and that Forestry be used for a variety of purposes. Protection for exposed uplands by shelterbelts, planting exposed areas of land of low quality, planting around eyesores, and planting for amenity purposes in the more dreary urban settlements, are typical of the proposals which would be both practical and beautiful. For Agriculture, Forestry, and other special land uses, it is assumed that this broad regional Report be followed by more detailed studies and, in particular, it is suggested (Chapter 15) that a Research Project should be initiated to study optimum use potential in a multi-use landscape.

A number of new ideas are put forward on recreation. Although the existing settlements are not generously provided with recreational facilities, most of them have at least, open if not always usable, land in the vicinity. With the large population increases proposed however, and with the new possibilities for leisure activity for the whole community, it has been thought necessary to consider the whole Region as potentially capable of contributing to recreation in many different ways. Most obvious, perhaps, are the proposals for a linear park

along the Almond Valley, with green ways running from it right through the Area. With the urban settlement pattern proposed, this could make green park space closely available to the majority of the new population for a variety of recreational purposes. Equally obvious are the proposals to develop regional parks in the Pentland Hills and the Bathgate Hills, to be both usable and accessible. Less obvious, but very desirable, are the proposals to use the many different land uses in a creative way, as, for instance, in the suggestion for a Demonstration Farm, where the many children of the new Lothians may learn some of the facts of life on the land and of the origins of their food supply.

A detailed study of this Report will disclose many proposals and suggestions, the main object of which is to improve man's total living conditions and possibilities. Some of these ideas will no doubt be argued and discussed widely in terms of desirability and feasibility; they should, however, be considered as part of a total conception for tomorrow's environment.

THE NEW REGION

The question may well be asked, "What kind of a vision do the planners have behind this great collection of surveys, statistics, learned documents, and two dimensional plans?"

Although we could answer such questions by referring them to the many proposals set out in the body of the Report, it seems desirable to attempt a brief description of what the Region might become in physical terms.

First, what were our guiding principles and objectives? In simple terms, one might say that we have been endeavouring to suggest, in physical terms, a means whereby the whole community might enjoy the environmental standards which in the past were enjoyed by only a few. Clearly this cannot be taken too literally, for it will never be possible for every family to live in a large and stately mansion (designed by the best architect of the day), with broad acres of private policies (landscaped by the best landscape architect); but it should be possible for every family in the Region to live in a clean, healthy and reasonably spacious home equipped with the latest labour-saving devices (designed by a team of the best architects of the day) carefully planned in a well designed neighbourhood and community (designed by a team of leading planners), with the surrounding open spaces landscaped by the best team of landscape architects available.

Residential Areas

This leads to the problem of planning standards for all kinds of human activities. Let us consider, therefore, some of the most important of these activities and their environmental needs. For domestic living, we need various kinds of residential areas. The standards for these must balance the need for adequate living space for all groups in the community against the necessity to avoid urban sprawl. In Britain, where land is scarce, we must in general build up to as high a density as possible without adversely affecting people's lives by overcrowding. We need standards of safety too, especially for the very young and very old, and also standards of rapid access from homes to work. For local community living, we need optimum standards of space and accommodation for a wide range of community facilities, for education, for health and recreation, for local shopping and for social activities of all kinds. Planning by itself cannot make a highly civilised community, but it can help to create the necessary environmental conditions, and there are few more promising parts of the world for experiments in environment than Scotland, with its cultural and educational tradition.

Industry

For standards of work, we have thought in terms of a new look at industry. It should no longer need to have the image of being grimy, untidy, smoke ridden, and generally a synonym for ugliness. On the contrary, for production, if nothing else, we need to have industrial plants in spacious, smart, tidy and green surroundings. Functionally, industry needs space to expand, space to deal with the arrival of raw materials and the dispatch of the finished products, and space for local amenity and recreational purposes. We need standards of convenience too, so that the workers can go expeditiously to and from their homes and into the urban centres.

Urban Centres

In the urban centres, we need the same combination of space without sprawl - planned, designed and functional. We need to provide for a variety of shops in safe, protected and spacious shopping centres, so that shopping can be an enjoyable human and social activity. Closely linked to the shopping centres should be the main cultural facilities, for if civilization is to mean anything, it should mean the gathering together of people for the purpose of enjoying the arts. For all these purposes, they must be able to get easily and efficiently to and from the urban centres.

Recreation

'Recreation' can cover many human activities, and can be concerned both with reviving the body and the mind. In the past, it has been all too often narrowly confined to physical recreation of a corporative nature, and the result has been to add one more depressingly plain and sometimes ugly, land use to an already poor quality environment.

In this Plan, we have endeavoured to keep as wide an approach to human recreational needs as possible. In doing so, we have had the benefit of the thoughts and ideas of a committee representative of a broad range of recreational interests. With the invaluable assistance of this committee, space standards have been set out for a large number of recreational facilities. We have also considered the contribution potential of many land uses within the Region to recreation. In some cases, it may be of a psychological nature. The careful landscaping of an industrial estate may make it an inviting place to visit, a cunningly arranged footpath system throughout the Region could give a new sense of exploration, while even the planting of a solitary tree in a strategic site may make all the difference to whether an area is worth taking a walk through or not. When added up, all those facilities can make a profound difference to the liveability of a Region.

Communications

As the oldest industrial country, most of our various methods of communication have evolved piecemeal over a long period. The time has now come when it is essential from every point of view to plan them all together so that we do not attempt to make any one method solve all our problems, particularly in view of the large amount of space and capital equipment already involved.

So long as railways are capable of functioning efficiently and economically, they should obviously be considered in the planning of any region. As a means of conveying large numbers of people quickly and expeditiously from one place to another, they are still unrivalled, but if people are to be attracted to them, they must offer more than simply an alternative to a frustrating car journey. Stations must provide comfort and convenience, and become inter-

change points for different modes of travel. If its rail services were operating at maximum potential, we doubt whether the Lothians Region would warrant a new monorail or hovercraft service for 'mass transit'.

So far as roads and the motor vehicles are concerned, it is an error to suppose that they can ever cover all the communication needs of a whole region, although clearly the motor vehicle gives much more personal mobility and therefore assists the liveability of outlying settlements. In a Region such as this, it can be of inestimable value, both in terms of public service vehicles (i.e. buses) and private cars. It is most important to think of roads in terms of certain new planning principles. There must, for instance, be a separation of vehicular and pedestrian movement - largely vertical in central areas, horizontal in others. There must be a hierarchy of roads, with specialized facilities and standards for each type. At one end of the scale are the new motorways, requiring technical disciplines almost as tight as main line railways; at the other, the residential road in the residential neighbourhood, with its overwhelming need for providing a high safety factor.

Conclusion

In this brief outline, we have endeavoured to illustrate a few of the conditioning ideas and principles which planners use for improving the environment, many of which have been embodied in this Report. The most important single physical planning idea is that of design co-ordination, whereby all the different land uses, social facilities and technological advances are developed in a co-ordinated way, and are designed individually and collectively to create a new concept of a regional city. The whole community today should be able to live comfortably, to enjoy good conditions of work, to go to as many places as possible as conveniently and efficiently as possible, and to engage in all the manifold activities of an advanced civilisation, in an efficient and beautiful environment. The Lothians Region can provide most of these, and in this physical plan we have tried to give some indication as to how they may be achieved.

Although, like any region, it has difficult problems, it also has almost unique opportunities. Situated in an extremely convenient location in the middle of Scotland's most populous central belt, near the two largest cities, it can add to these advantages a great deal of beautiful existing landscape, and a vigorous and energetic people. The existence of a New Town is a powerful agency of development and, with goodwill, co-operation, and sustained enthusiasm at all levels, it could become a model for regional development at an international level.

Chapter 2. RELIEF AND CLIMATE

INTRODUCTION

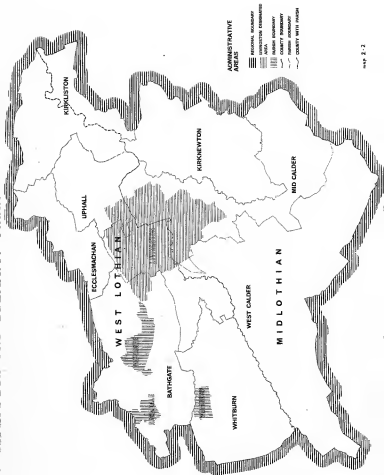
The Lothians Region lies in the Midland Valley of Central Scotland. The Valley, approximately fifty miles wide, extends from Angus and East Lothian in the east, to Renfrewshire and Ayrshire in the west. The Firth of Clyde is further to the west, with the Firth of Forth close-by to the east and north (see Map 2.1).

The Lothians Regional Survey Area covers 85,034 acres, or approximately 133 square miles, including 6,700 acres, or approximately 10.5 square miles, designated for the Livingston New Town.

The Survey Area's boundary is six and a half miles west of Edinburgh's Waverley Railway Station and twenty miles east of Glasgow's Queen Street Railway Station. The area conforms to the statistical boundaries of nine civil parishes which are divided between the two counties of West Lothian and Midlothian (see Map 2.2).

The Midlothian County Council is responsible for administering 44,724 acres, or 52.6% of the total Survey Area, and the West Lothian County Council administers 40,310 acres, or 47.4% of the total Survey Area. Areas of land in each County and Civil Parish, which include the three barchs, are as follows:

Midlothian Civil Parishes		West Lothian Civil Parishes	
	Acres		Acres
Kirkliston (part of)	2,281	Kirkliston (part of)	5,728
Kirknewton	9,363	Bathgate	10,860
Mid Calder	12,101	Whitburn	9,776
West Calder	20,979	Ecclesmachan	4,060
		Livingston	5,357
		Uphall	4,529



GEOLOGY*

Solid Geology (See Map 2.3)

Geologically the oldest rocks in the Lothians Regional Survey Area are of the Silurian Age. Towards the end of this Age, layers of water-deposited sediment were subjected to compression and folding action and this created severely faulted, steeply westward-dipping strata. When this crustal movement ceased, extensive climatic denudation occurred and the whole area then subsided.

Rocks of the Old Red Sandstone Age were later deposited over this irregular surface and Silurian debris was swept into the depression caused by the Highland and Southern Upland Fault-Line, forming the present conglomerates. Severe crustal movement occurred later developing an anticlinal fold with a series of strike faults in the Pentland Area. Lavas erupted from local volcanoes, followed by periods of quiescence in which further sediments were laid down. Following a period of uplift, denudation and subsidence, younger sediments of the Old Red Sandstone Age were deposited over a slowly subsiding area which was subjected to frequent flooding and desiccation.

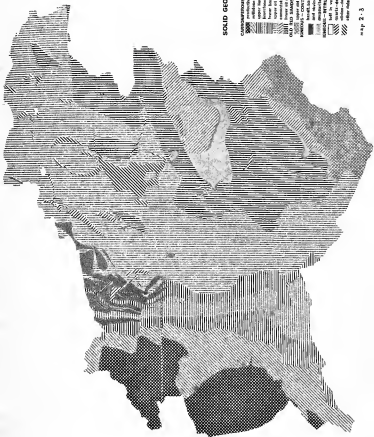
Volcanic activity continued into the Carboniferous Era and lavas and tufas were discharged into inland lakes already containing sediments of the Cementstone group. This deposition period was closely followed by the creation of the Upper Oil Shale Group, containing thin coal seams as well as the bituminously-impregnated oil shales. These seams are separated by Burdiehouse Limestone.

The formation of the Carboniferous Limestone Group began after further submergence and later provided surfaces sufficiently fertile to support vegetation. The existing coal seams now being mined originated with this vegetation. The middle Carboniferous Limestone Group contains sandstones, shales, coals, fireclays and ironstones. Limestone deposits in this group are few and thin, whilst in the upper and lower group, they are well represented.

Deltatic deposits forming the Millstone Grit Series succeeded the Carboniferous Limestone Group. These deposits of coarse-grained sandstone with shales, fireclays and 'ganisters', indicate a pronounced uplift, with rivers flowing from surrounding rising land. The presence of thin coal seams indicates occasional movement of the surface to conditions similar to those previously prevailing.

Productive Coal Measures formed in the Upper Carboniferous Era contain several valuable coal seams separated by sandstones, sandy shales, dark shales and fireclay. The Productive Coal Measures and the Upper Barren Red Coals are the two principal seams, the former having been extensively mined in the Fauldhouse/Armadale/Blackridge area. The land was subsequently uplifted and subjected to intrusions of quartz-dolerite sills and dykes. A semi-arid climate then prevailed to form mudstones, sandstones, shales and marls on the uplifted areas. The present distribution of strata results from prolonged denudation following powerful Permo-Carboniferous crustal movements, faulting and additional displacement along the older fault lines.

* Much of this section is based on information taken from the Ordnance Survey - Geological Survey of Scotland.



SOLID GEOLOGY

- CARBONIFEROUS ERA**
 - millstone gill series
 - upper lamothian group
 - lower lamothian group
 - upper oil shales
 - lower oil shales
 - lower oil shales
- OLD SANDSTONE ERA**
 - lower oil shales
 - lower oil shales
 - lower oil shales
- NEW SANDSTONE ERA**
 - lower oil shales
 - lower oil shales
 - lower oil shales
- STRUCTURE**
 - fold in rocks
 - fold in rocks
 - fold in rocks
- OTHER FEATURES**
 - fold in rocks
 - fold in rocks
 - fold in rocks

Drift Geology (See Map 2.4)

Prior to the occurrence of the Quaternary Ice Sheets, normal surface erosion produced a landscape broadly similar to that now existing. Some modification of the terrain did however result from glaciation, and erosive and abrasive action of the ice-sheets flowing across the Survey Area from the west is indicated by the depth and continuity of the boulder clay, though subsequent erosion has removed most of the deposits from higher areas. During the Glaciation Period the sea rose and deposited gravel, sand, laminated silt and brick clay.

As the ice melted fluvioglacial deposits of sand and gravel were revealed in varying proportions. These deposits are extensive beyond the Survey Area, east of the Pentlands, along the Esk Valley and between Linlithgow and Blackness.

North-west and south-east of Bathgate, marine and freshwater alluvium deposits exist in a series of terraces. These terraces were created in comparatively recent geological times, when the sea again rose. Later the sea subsided to its present level.

Extensive areas of peat exist between the foothills of the Pentland Hills and the western boundary of the Survey Area.

Soil Structure

Soils mainly depend upon the underlying rock structure and the effects of glaciation; they may be classified into three groups: boulder clay; alluvium; and marine sands and gravels.

Fresh water alluvia, ranging from silty-loam to clay, are found in small patches along the banks of the River Almond, with extensive deposits occurring near Kirkliston. The soil texture varies considerably, ranging from fine to heavy-sandy loams.

Glacial and marine sands and gravels, though not uniform in character, are fine, easily worked and heat more readily than heavy boulder clay. Sandy clay drifts are found in the north from the parish of Ecclesmachan to near Livingston and in the Riccarton Hills. The soil texture ranges from sandy-medium to heavy loam. The underlying material in the undulating areas south of Kirkliston is generally sand. The surface soil is fairly good and loams are common.

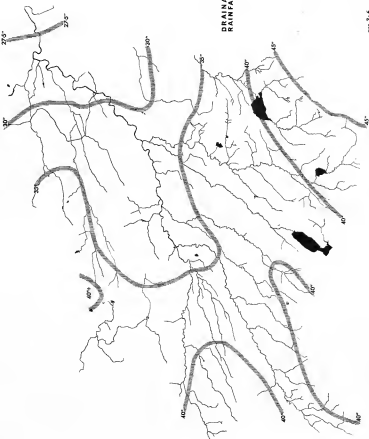
These soil types may be further classified in order of quality: the richest soils resting on sedimentary till; alluvia soils; fluvioglacial sands and gravels; and the least good, thin soils on igneous rock (see Map 4.1).

North of a line from Bangour to Edinburgh, the ground is covered with a light textured sediment-drift, and further to the north-west, heavy loams are found with small areas of sandy-heavy loams. Variations in this drift are mainly caused by intrusions of sandstone and dolerite. Around Houston Wood and Drumsoreland Muir, the surface sediment-soil ranges from heavy to sandy-heavy loam but this soil overlies a stony clay drift. Where these drifts remain uncultivated and undrained a peat covered waterlogged surface has developed.

Igneous rocks are found throughout the Survey Area, especially in the Riccarton Hill district. Here they generally form isolated hilly features like Binny Craig. The rocks are generally basic in character, the most common types being basalt and dolerite. These rock-types disintegrate into light textured, well-drained, brown medium-loams, but, due to the shallow nature of the soil and the outcropping, nearby

TOPOGRAPHY

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DRAINAGE and RAINFALL

map 2-6

soils are only partly cultivated, generally being grassed or planted with shelterbelts of trees.

RELIEF, NATURAL DRAINAGE AND RESERVOIRS

Relief and Natural Drainage

The Lothians Region is contained by the Pentland Hills, the Wilsontown Upland, the Slamannan Plateau, and the Torphichen/Bathgate/Riccarton Hills (see Map 2.5).

The highest lands affecting the Survey Area, the Pentland Hills, are dominated by Scald Hill (1898 feet) and Carnethy Hill (1890 feet). Wilsontown Upland and Slamannan Plateau both rise to approximately seven hundred feet, whilst the Torphichen/Bathgate/Riccarton Hill group is dominated by Cairnpapple Hill (1000 feet), The Knock (1023 feet) and Riccarton Hill (833 feet).

Major features within the Survey Area are: Deer Hill (625 feet), Tar Hill (413 feet), The Knock (1023 feet), Binny Craig (721 feet) and Raven Craig (958 feet) to the north, and the Pentland Hills in the south.

The Survey Area is divided by the River Almond and Breich Water, both flowing eastwards; the former from south of Harthill to north of Turnhouse Airport, the latter from south of Fauldhouse to join the Almond near Seafield. Owing to the complexity of the natural undulations and the many tributaries of the Almond, initial drainage falls generally south or north to the River Almond, thence in a north-easterly direction to the Firth of Forth. The surrounding terrain does not fall uniformly towards the Almond, the southern slopes being much steeper than the northern slopes.

Reservoirs

Extensive areas underlaid during the Old Red Sandstone Age, and the consolidated sands, gravels and sandstones of the Carboniferous Age now function as water catchment areas. These occur at Harperrig, Crosswood, Morton, Cobbinshaw, Ballencrieff, Sunnyside, Petershill and Bargoyle, and are controlled by Water Boards, British Island Waterways Commission, Burgh Councils, County Councils and the Hospital Board.

CLIMATE

Meteorological records are not available for the exposed south-western sector of the Region, which includes Cobbinshaw, Breich, Fauldhouse, Whitburn, East Whitburn, Blackburn, Seafield, Livingston, Harthill and Armadale. With the exception of rainfall statistics, no meteorological records are available for any urban settlement within the Survey Area. The most comprehensive meteorological records for sites adjoining the Area have been recorded for Turnhouse Airport lying midway between Livingston and Edinburgh.

Rainfall

Rainfall statistics have been recorded for several districts within the Survey Area. Appendix A, Table 2.1, summarises the monthly rainfall averages for the standard thirty five year period from 1916 to 1950. This Table shows that rainfall and altitude are closely related and district figures have therefore been tabulated according to altitude. Irrespective of altitude and exposure, October is the wettest month of the year.

At Middleton Hall, Uphall, the monthly rainfall figures expressed as a percentage of the annual rainfall are:-

Month	J	F	M	A	M	J	J	A	S	O	N	D
%	10.1	6.9	6.2	6.0	7.2	7.1	9.2	10.2	9.2	10.5	9.2	8.2

Rainfall figures for any two consecutive years may vary considerably, as may the rainfall for neighbouring districts for the same year.

Rainfall statistics are converted into isohyet lines and superimposed over the Survey Area in Map 2.6. These lines indicate general rainfall; a dry year may affect the lines by sixty per cent, and a dry three-year period by eighty per cent.

Annual rainfall is of major importance to the agriculturist; land in the Survey Area receiving less than thirty inches of rain per annum being generally well suited to grain crops. The Kirkcaldon Parish, for example, produces more wheat and barley than any other parish in the Survey Area. As the annual rainfall increases above thirty inches, so does the uncertainty of ripening grain crops. In the south, south-west and west of the Region, the land use pattern changes to periodic or permanent grasslands which support the dairying and livestock industries. Generally, hill-sheep farms predominate at the forty inch isohyet line and above.

Rainfall can appreciably reduce soil fertility and unless the effects of excessive rain are controlled by planting trees and other vegetation, areas of high rainfall will remain 'sub marginal' and support only 'rough grazing'.

Temperature

Average temperature statistics are not available for sites within the Survey Area, but Appendix A, Table 2.2, records air temperatures for sites outside the Survey Area to the north, north-east and south-east. For analysis purposes these have been tabulated according to altitude. The nearest recording station is at Turnhouse Airport. This Table shows temperature decreasing with altitude and the effects of exposure, shelter and reduced maritime influence.

Areas nearer the Firth of Forth have lower spring temperatures. This is statistically illustrated by the average maximum temperature recorded at Falkirk (105 feet), exceeding that of the Royal Botanic, Edinburgh (76 feet) from March to October. The Table shows the average minimum midwinter temperature of the Royal Botanic to be -0.1°C ., whilst the average maximum midsummer temperature is 19.2° . By comparison, the mean January temperature at sea level along the whole eastern British coastline is around 4°C ., whilst the average maximum midsummer temperature is 15°C .

All temperature readings confirm that the highest average maximum temperature is reached in July. However, in a predominantly agricultural area the annual number of plant-growing days is more important than maximum and minimum temperature. A plant-growing day occurs when the temperature exceeds 5.5°C . (42°F). Temperature recording stations at the Royal Botanic, Edinburgh (76 feet); Blackford Hill Edinburgh (441 feet); Boghall, Midlothian (539 feet); and West Linton, Peeblesshire (820 feet) have a total of two hundred and forty three, two hundred and thirty, two hundred and five and one hundred and eighty-eight growing days per year respectively.

Crops grown near sea level tend to ripen earlier in the season than those grown at higher altitudes, as the result of higher average temperatures. Orientation is a major factor, since an increase of two or three degrees in the sun's angle of incidence on southern slopes can advance Spring ground temperatures by several weeks. Ground temperature is generally more important to the agriculturist than air temperature.

Sunshine and Clouds

Statistics of hourly averages of bright sunshine are not available for sites within the Survey Area although records exist for neighbouring north-eastern and eastern districts. These are given in Appendix A, Table 2.3, and for analysis purposes are tabulated according to altitude. It shows that nearly all southern Scotland has an annual 1,200 - 1,400 sunshine hour rating, and that within the Survey Area the average daily sunshine rating for January and June is approximately one and a half hours and six hours respectively.

Snow

Neither snow-falling nor snow-lying records are available for sites within the Survey Area. Appendix A, Table 2.4, however, shows the number of days on which snow has been found lying on the ground at 0900 hours G.M.T. The seven sites to which this Table refers adjoin the Lothians Region, Turnhouse Airport recording station being the nearest. For analysis purposes, sites are tabulated according to altitude. This Table shows that snowfall is related to altitude and proximity to the coast.

December, January, February and March are regarded as the snow-falling months but variations between the same snow-falling day in two consecutive years is often considerable; indeed, snow may not occur at all throughout a particular year.

In the vicinity of the Survey Area the annual average number of snow-falling days for land below two hundred feet is approximately eighteen. Frequency increases with altitude and remoteness from the coast. Generally, above the one hundred foot contour one additional day of snow per year occurs for every increase of fifty feet in altitude.

Although some areas receive more snow than others, it does not necessarily follow that it will remain longer. Lying times vary according to aspect and altitude. Snow is often more an asset than a hazard as it forms a protective blanket from frost. The water run-off rate from Spring-thaw is slower than for normal rainfall and this has the advantage of allowing thawed water to be absorbed by the land instead of flowing over the surface. Severe snowfalls, however, are both damaging and dangerous to motorists and hill-sheep farmers, blocking roads and at times burying sheep.

Fog

Statistics are not available for sites within the Survey Area; however, Appendix A, Table 2.6, records the number of days when at 0900 hours G.M.T. fog at Turnhouse Airport reduced visibility to less than 1,100 yards. Persistent fog seldom occurs and morning fogs tend to disappear towards mid-day.

Three basic types of fog affect the Survey Area; radiation fog, which occurs on cloudless nights as ground surfaces cool; advection fog which occurs when warm air currents pass over cold land or water surfaces; and steaming fog which occurs when cold air passes over warmer water surfaces.

The Survey Area experiences reduced visibility of less than two hundred and twenty yards more frequently than most of southern Scotland. Turnhouse Airport readings, using one thousand one hundred yards as a visibility criterion, indicate not only that the area is subjected to fog for an average of eleven days per year, but that it occurs irrespective of the month. The frequency of reduced visibility within the Survey Area is indeterminable as no two hundred and twenty yard visibility ratings are available.

Wind

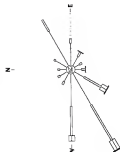
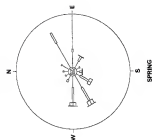
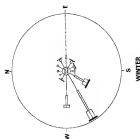
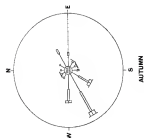
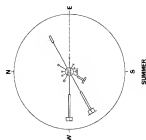
There are no wind intensity records available for any district within the Survey Area. Appendix A, Table 2.1, gives details of Edinburgh's monthly wind chart related to direction and wind intensities expressed as a percentage of the whole year. Diagram 2.1 shows wind polar diagrams covering the 1957-1961 yearly and seasonal averages, and the wind frequency, speed and direction recorded at Turnhouse Airport.

The most notable feature is the north-east and east winds which reach Edinburgh during April, May and June. These cold winds blow coastal fog into the low-lying parts of the Area, creating unpleasant conditions and retarding plant growth. Wind conditions adversely affect the Area during early Spring as they increase in intensity by funnelling along the valleys leading from the Firth of Forth into the Survey Area. During Autumn and Winter the reverse procedure occurs, resulting in strong prevailing winds from the south-west.

Frost

Appendix A, Table 2.2, shows the number of days in which ground and air-frost occurred at Turnhouse Airport, Edinburgh, from 1949-1963.

Frost is generally an accumulation of falling cold night air, often collecting in pockets due to bad 'air drainage', or the freezing of condensed moisture due to radiation heat loss. Falling streams of cold air also occur during daylight, especially on north-facing slopes shaded from the sun, draining into the flat, low-lying land and valleys. Areas susceptible to frost generally lack air movement and record a lower-than-normal winter temperature. These areas deter healthy plant growth, making them less suitable for agricultural purposes and for urban development.



FREQUENCY, SPEED AND DIRECTION OF WIND

TURNHOUSE AIRPORT,
FIFE (SHIRAZ)

During the five year period
1957-1961, four observations at
10, 1200, 1600, 2000, 2200, 2400, 2600
and 2800 hrs. local.

Scale of Frequency
1 to 10 knots
11 to 20 knots
21 to 30 knots
31 to 40 knots
41 knots or more
(1 knot = 1.1 miles per hour)

Sheet 2 of 2

SUMMARY

The Lothians Region lies in the Midland Valley of Central Scotland, close to the Firth of Forth on the north-east. It covers about 133 square miles. Edinburgh is six miles eastwards and Glasgow twenty miles westwards.

Geology

Solid Geology. The oldest rocks are Silurian; later deposits, with the exception of igneous penetrations, belong to the Carboniferous Era. The strata dip westward, with the major surface outcrops running north-south. These are mainly calciferous sandstone, carboniferous limestone, millstone grit and coal measures.

Drift Geology. The Area is almost completely covered with glacial, alluvial and marine deposits of boulder clay, gravels, sands, and silts. Peat covers extensive areas on the upper slopes, and the lower parts which have poor drainage.

Soil Structure. The soils in the Area are mainly derived from boulder clay, alluvium and marine sands and gravels.

The lighter and more easily worked alluvial soils are found in the parishes of Kirkliston, Ecclesmachan and Livingston. Where soils are derived from the underlying igneous rock, they tend to be shallower and less productive. Such types are found, for example, in the Bathgate and Riccarton Hills, Craig Binning and Kirknewton areas.

Relief, Natural Drainage and Reservoirs

Relief and Natural Drainage. The Area is contained by the Pentland Hills, the Slamannan Plateau and the Bathgate Hills, rising to 1,898 feet, 700 feet and 1,000 feet respectively. The River Almond which flows diagonally across the Area from west to east is the principal drainage channel.

Reservoirs. The impounding of selected streams has formed reservoirs in some of the principal catchment areas, e.g. Harperrig and Cobbinshaw.

Climate

Few records are available for the Survey Area. The most comprehensive ones for an adjoining area are for Turnhouse Airport, on the eastern boundary.

Rainfall. Average annual rainfall varies from 27.5 inches to 45 inches, depending on the location. There is a crude coincidence between rainfall and altitude; the highest areas being the wettest. October is usually the wettest month, having 10.5% of the annual rainfall, and April the driest, with 6%.

Temperature. Average temperatures tend to fall in direct proportion to higher altitudes, exposure and orientation. The average annual minimum temperature is between 5.3°C and 6.0°C, depending on location; the average annual maximum between 12.5°C and 13°C.

Sunshine and Clouds. Nearly all southern Scotland has an annual rating of 1,200 - 1,400 hours of sunshine.

The average daily rating for January and June is approximately one and a half hours and six hours respectively.

Snow. The annual average number of snow-falling days for land below two hundred feet is eighteen. Frequency increases with altitude and distance from the coast. Generally, for every fifty feet increase in

altitude above one hundred feet, there is an additional day of snow per year. December, January, February and March are usually the snow-falling months.

Fog. Turnhouse Airport readings, using one thousand one hundred yards as a visibility criterion, indicate that the area is subjected to fog for an average of eleven days per year, and that it occurs irrespective of the month.

Wind. The prevailing winds are from the west and south-west. They are particularly strong during the Autumn and Winter months. A notable feature is the north-east and east winds which occur in March, April, May and June. January, February and December are the gale months.

Frost. Appendix A, Table 2.9, shows the number of days in which ground and air frost occurred at Turnhouse Airport from 1949-1963. It shows in a remarkable way how few frost-free months there are. In the fifteen year period covered, ground frost has occurred at least six times in every summer month.

Chapter 3. HISTORIC, ARCHITECTURAL AND SCIENTIFIC INTERESTS

INTRODUCTION

The Survey Section of this Chapter is divided into four parts. The first traces the history of man's occupation of the Area since prehistoric times. The second discusses some of the buildings of historic and architectural interest and sites of historic significance (see Map 3.1 and Appendix B, Tables 3.1 and 3.2). The third mentions famous people associated with the Area. The fourth part deals with fauna and flora and their general distribution (see Map 3.2 and Appendix B, Table 3.3). The Survey is followed by Proposals and both are summarised at the end of the Chapter.

SURVEY

1 Historic Outline

Early Origins

It is unlikely that Palaeolithic Man ever reached Scotland. However, Neolithic Man established himself in the Lowlands at the end of the Ice Age, and traces can be seen in certain parts of the Cairnpapple monument. Neolithic Man was followed simultaneously by the Celts and the Picts, two races who came into considerable conflict. Traces of their occupation can be seen in the Standing Stones near Bathgate and near Kirkliston.

Roman Occupation

The main Roman routes are outside the Area, but it is certain that Castle Greg camp at Camilty Hill is Roman, and it is possible that this lone camp, one day's walking distance from the Roman settlement at Crumond, was used as a base.

Anglo-Saxons

The Gadani, descendants of early British tribes, tried to retake possession of the Lowlands when the Romans departed. In the fifth and sixth centuries, the Angles, Germanic pirates, gained an insecure hold until overrun by the Celts. The Angles and Saxons eventually established a more settled government in 617 A.D.; the Scots finally ended their rule in 960.

Mediaeval Influences

Until recently, the counties of Mid and West Lothian were known as part of 'Edinburghshire' and 'Lindithgowshire'. From about 1150, there was a steady flow of Normans and Flemings into the two counties. Norman influence is evident in the Romanesque style of architecture in several of the churches. No trace remains of mediaeval castles, nor of pre-fourteenth century domestic buildings.

In 1160, the Calder were divided into Calder Clere and Calder Comitis. In 1306, during the Wars of Succession, Calder Comitis was given by Robert the Bruce to James Douglas, an ancestor of the Earls of Morton. Calder Clere and Calder Comitis became 'Mid' and 'West' Calder in 1847.

Modern Settlements

During the middle period of Scottish history, parts of the Area were involved in political conflict which largely centred round Linlithgow Palace. With comparative peace after 1745, the Area's natural resources were developed under the influence of the Industrial Revolution. As small farms declined, agricultural immigrants flocked into the Area for employment in mines and factories. New forms of communication and mechanisation accelerated the exploitation of natural resources, reaching its peak in 1913. Of the few traditional buildings which survived the impact of the Industrial Revolution, many are today threatened with natural decay, mining subsidence, or the encroachment of building development. Technical developments during the first half of the twentieth century, although accompanied by great building activity, contributed little to architectural quality.

Growth of Settlements

A pattern of dispersed individual farmsteads linked by a network of roads formed the earliest building development in the Area.

Coaching inns were usually sited at the intersections, development growing around them and spreading along the major roads. Blackburn in West Lothian is a good example.

With the expansion of industry and mining in the nineteenth century, workers were accommodated in closely packed rows of single-storey houses near the mine or factory. Many of these miners' rows remain, surrounded by more recent development.

Immediately after both World Wars, many houses were built by Local Authorities, and these are mainly located on the periphery of existing industrial communities. Broxburn and Uphall were amalgamated by this type of development. In recent years, Local Authority housing has changed from semi-detached development to terraced or slab block form.

Character of Settlements

The urban settlements in the Area can be broadly classified into two categories: the rural village, such as Midcalder; and the industrial community, such as Armadale. The latter category predominates.

The rural village is generally associated with a policy estate, several of which exist in the Area, such as Almondell and Calder House estates. The villages are well related to topographical features and retain their intimate, informal character with several examples of simple, rugged, traditional Scottish architecture.

In contrast, the industrial village was related to the mine or factory, with little consideration for siting, apart from proximity to the source of employment. Considerably less care and pride has been taken in the layout and design of the buildings, many of which have suffered from exposure and smoke pollution. Repetition of house types presents a monotonous frontage to treeless streets, while close by, piles of spent shale rise steeply two hundred feet and more above ground level.

2 Buildings and Sites of Historic and Architectural Interest

Livingston

The name 'Livingston' has two possible derivations: either from a Count Liven who came to Scotland with Margaret, wife of Malcolm Canmore, and was given land on the site of the present village; or from a certain 'Loving' the Fleming, who lived there in the reign of Alexander I.

Livingston Parish Church was built in 1130, burned down by Cromwell and rebuilt in 1732. Beneath the church is one of the earliest known systems of central heating. The silver Communion cups in the church bear the inscription "Gifted by Sir Patrick Murray of Livingstone, 1696".

The farmlands of Newyearfield are the site of an ancient hunting-seat of Scottish kings. The original keep, known locally as 'The Place', stood until c.1790. The village contains many old carved stones set in walls and dykes, which are believed to have been taken from the ruins of this hunting seat. Nearby in Ladywell farm there is a well which, according to tradition, has magical powers.

The Peel of Livingston, once an old castle to the east of the church, was strongly guarded by a broad rampart and moat. Edward I garrisoned his troops here in 1302. In the late seventeenth century, it was replaced by Livingston Manor House (demolished in 1812), home of Sir Patrick Murray, Baron of Livingston, an enthusiastic horticulturist and botanist.

Table 3.1

HISTORIC AND ARCHITECTURAL INTERESTS

Key to Map 3.1

1. Livingston Parish Church
2. Newyearfield
3. Ladywell
4. Peel of Livingston
5. Charlesfield
6. Newlston House
7. Newbridge Inn
8. Cairn and Stone Circle
9. Cat Stane
10. Lin's Cave
11. Encampment Site
12. Kirkliston Parish Church
13. Carlowie Castle
14. Auldcaithie Church
15. Niddry Castle
16. Ecclesmachan Village Church
17. Binny Craig
18. Binny Quarries
19. Standing Stones
20. Cairnpopple Hill
21. Balbardie House
22. Bathgate Academy
23. Oatridge Hotel
24. Houston House
25. Parish Church of St. Nicholas
26. Kirkhill House
27. Calder House
28. Midcalder Parish Church
29. Cunnigar Hill
30. Castle Greg
31. Cairns Castle
32. Marleston House
33. Marleston Castle
34. Linhouse
35. East Calder Parish Church
36. Hog-backed tombstone
37. Kirknewton House
38. Cromwell's Stone
39. Hartburn House
40. West Calder Parish Church



BUILDINGS AND SITES OF HISTORIC AND ARCHITECTURAL INTEREST

● POSITION OF SITE OR
BUILDING

NUMBERS REFER TO TABLE 3-1

Charlesfield was once the home of Sir Henry Raeburn's son, Henry, and later his grandson, L. E. Raeburn. Many of Raeburn's best pictures were housed here during this period. The present mansion was built in 1795-8.

Newbridge and Kirkliston

Newliston House, built for Thomas Hog between 1789 and 1792, was the last country house designed by Robert Adam, who also designed some of the mantelpieces, friezes, gilt mirrors and pelmets. The wings were added by David Bryce in 1845. Between 1722 and 1742, the formal garden was planned and laid out, with artificial ponds, sunken fences with high walls and bastions, avenues of trees, plantations and the Hercules Wood with lime avenues in the form of a Union Jack to commemorate the Battle of Dettingen. The now ruined dovecot is an Ancient Monument.

Newbridge Inn dates from 1683, and is an L-shaped house, with two upper storeys built of rubble. The inn was renovated and its frontage modernised and enlarged in the nineteenth century.

The Cairn and Stone Circle at Newbridge is a simple earth cairn dating from sometime within the Second Millennium B.C. It is slightly hollowed at the summit, about a hundred feet in diameter and about ten and a half feet high, and is surrounded by the remains of a stone circle.

Vetta's Grave (the Cat Stone) and Lin's Grave are both marked with inscribed tombstones; the former dates from the early Christian Era, and the latter from 1643.

Edward I made camp south-west of Kirkliston in 1297 during his Scottish campaigns.

Kirkliston Parish Church dates from about 1200, and shows the transition from Norman to early English work. Much of the original masonry remains.

Carlisle Castle is a typical late eighteenth century Scottish dwelling house, containing the fragment of a cross-shaft made of sandstone, believed to be the finest of its type in Europe.

Winchburgh

Auldcaithie Church, a pre-Reformation structure, stands in ruins. Niddry Castle dates from the turn of the fifteenth century, with seventeenth century additions. In 1568, Mary Queen of Scots spent her first night here after escaping from Loch Leven Castle.

Ecclesmachan

The village church is mainly eighteenth century, though it contains mediæval fragments.

On Binny Craig beacons were lit during the threat from the Spanish Armada, and from Binny Quarries sandstone was hewn for many of Edinburgh's New Town buildings, among them the Scott Monument.

Bathgate

The early commercial importance of Bathgate is indicated in the Charter of James VI in 1596, which gave the right to hold seven fairs annually within the town.

The two Standing Stones at Gala Braes are irregular in shape, and probably date from the late Neolithic or Bronze Age.

Cairnpapple Hill was constructed as a Neolithic Sanctuary in about 2000 B.C. and used until about 1700 B.C. During the Bronze Age (about 1500 B.C.) it was remodelled as a burial cairn and used for religious ceremonies. Although not in continuous use, it was a place of religious observance for over two thousand years. The outer octagonal-shaped bank was probably added in the eighteenth century.

Balbardie House is a Georgian mansion, built around 1793, possibly from a design by Robert Adam. It once stood in a beautiful park but today is surrounded by bings.

Bathgate Academy was built in the classical style in 1831-33.

Broxburn/Uphall

The village of Uphall was used as a coaching station on the turnpike road from Edinburgh to Glasgow.

Oatridge Hotel served as a coaching inn in the eighteenth and nineteenth centuries and is still in use.

The originally Norman Parish Church of St. Nicholas, Uphall, has been greatly altered.

The original L-shape of Houston House, Uphall, built in 1690, was added to in the late seventeenth century.

Kirkhill House, Broxburn, probably dates from the end of the sixteenth century. The present building, now a farmhouse, was constructed in 1770 by David Stewart Erskine, eleventh Earl of Buchan. The original house, which had lain in ruins since 1743, is now used as outhouses.

Mid and East Calder

The present mansion of Calder House, Midcalder, which is mainly eighteenth century, stands on the site of an old fortress, and has been the seat of the Sandilands family since the fourteenth century.

Midcalder Parish Church was founded in the early thirteenth century by Duncan, Earl of Fife. The apsidal choir, rebuilt in 1541, is the oldest existing part of the church.

Cannigar Hill or 'Witches Knowe' is a prehistoric mound, possibly a Pictish fort. A number of people suspected of witchcraft were burned to death there during the seventeenth century.

Castle Greg, Camilty Hill, was a small Roman Camp. When excavated a hundred years ago, Roman fragments were found.

Cairns Castle ruins, built c. 1440 by Lord Crichton, Lord High Admiral of Scotland, as a look-out for cattle raiders, lie beside the Lang Whang (now the A70), an old drove road to the Borders.

Murieston House stands on the site of an older house. The two wings were added about 1830. Sixteenth century stables are still used.

Murieston Castle was originally a free-standing sixteenth century tower. It was rebuilt and drastically restored in about 1820 as a picturesque ruin.

Linthouse or Burnbrae dates from the end of the sixteenth century. Two further wings were added at the turn of the seventeenth century.

The Parish Church of East Calder, probably built in the sixteenth century, is now a ruin. There is an interesting sculptured stone in the west gable.

The Hog-backed Tombstone in Kirknewton Churchyard is an Ancient Monument.

Kirknewton House, once known as Meadowbank House, was built c. 1690. A Georgian East Wing was added in about 1795 but demolished in 1950. The original house was altered by William Playfair in about 1835.

Greater Polbeth

In 1650, Cromwell and his army camped in the Parish of West Calder. This event is commemorated by a monument known as Cromwell's Stone.

Harburn House was built by Young in 1807, and its grounds were laid out to embrace a formal lake. An old castle on the estate is said to have been fortified by Cromwell to repress the Moss-troopers. Near the house stands a free-stone monument, inscribed "Charles X of France, during his exile, stood on this spot when last at Harburn, 3rd September 1832".

West Calder Parish Church, now in ruins, has the date 1643 inscribed on the cope-stone above the original doorway.

Note

The sites and buildings discussed here are located on Map 3.1 (see also Table 3.1). Further buildings of historic and architectural interest are listed in Appendix B, Tables 3.1 and 3.2.

3 Famous People Associated with the Area

John Knox (1506-72) celebrated the first sacrament of the communion after the Reformation, according to the Protestant fashion, in Calder House.

Archbishop Spottiswood (1565-1639) was born in the manse at Midcalder. The parson of Calder Comitis during the Reformation, he later became Archbishop of Glasgow, and was one of James I's Privy Counsellors. He crowned Charles II in Edinburgh Castle and wrote a history of the Church of Scotland. He died in 1639 when Archbishop of St. Andrews.

Henry Erskine (1746-1817) and Lord Chancellor Erskine (1750-1833) are both buried in Uphall Church. In Kirkliston Parish churchyard is the tomb of the first Countess of Stair who is associated with Sir Walter Scott's novel 'The Bride of Lammermoor'.

Bathgate was the birth-place of Sir James Y. Simpson (1811-70), who introduced the use of chloroform in 1847.

Dr. James Young (1811-83) was an analytical and experimental chemist who laid the foundation of the Scottish Oil Industry. In 1850, he discovered a method of extracting oil from coal. This process was carried out at Boguehead, near Bathgate, until 1864. Dr. Young later turned to extracting oil from shale at Addiewell (1864 to 1866), and, in so doing, he founded the mineral oil industry of Scotland.

AREAS OF SCIENTIFIC
INTEREST

||||| FAUNA
||| FLORA



map 3-2

David Livingstone(1813-73) laid the foundation stone at Addiewell Works on August 9th, 1864.

4 Scientific Interests

In the past hundred years, the natural life of the Area has diminished considerably, mainly because of the pollution of rivers and streams by the shale and coal industries and by sewage disposal. Improved sewerage and the decline of the extractive industries over the last twenty years has encouraged the gradual return of aquatic life and waterside plants and birds, and recent plantations by the Forestry Commission have attracted a greater variety of birds and summer visitors to the northern part of the Area.

Mammals

Around Broxburn, there are several of the larger wild mammals including the badger which gives its name to Broxburn. Foxes, using old badger sets, are found in the same district. Hares and rabbits are found in abundance throughout the Area, and during the past few years, several roe deer have been seen in Almondell Estate and the Bathgate Hills. In the southern part of the Area, larger mammals are rare, due to large areas of open marshland and lack of woodlands. The grey squirrel is very common in West Lothian and can be found in most conifer plantations.

Birds

The Area is well-known for its wildfowl. Cobbinshaw Reservoir is frequented by mallard, teal, widgeon, tufted duck, goldeneye, greylag goose, pink-footed goose, and whooper swan. The Reservoir was the principal roost of the pink-footed goose until recent years when their numbers declined: 2120 in 1955, none in 1960, between 150 and 270 in 1961. Harperrig Reservoir attracts large numbers of mallard but not the pink-footed goose; otherwise it has the same species of wildfowl as Cobbinshaw, but in lower proportions. In 1963, whooper swans roosted on a pond heated by the Pumphreston Bing Works.

The rest of the southern part of the Area has fewer birds, due to the lack of woodland, and is too flat and boggy for grouse. Snipe and curlew can be seen in certain parts of the southern moorland.

The dipper is common on the Murieston Water, and the grey wagtail on the Linhouse Water. At Binny Quarry, near Ecclesmachan, the occasional kestrel has been observed. The Quarry is too enclosed for ducks, but warblers and summer visitors frequent the vicinity. The green woodpecker and the greater spotted woodpecker may be observed east of West Calder village and around Hartwood, and the green woodpecker is also found in the grounds of Bangour Hospital. The dab-chick, or little grebe, can be seen on the Union Canal.

Reptiles

Common reptiles are now rare in the Area. At one time, the numerous ponds supported a varied and unusual selection of frogs, toads and newts, but these ponds have become badly polluted by the extractive industries. Newts are still found along the River Almond between Midcalder and the Almondell Estate.

Fish

Over the past twenty years, fish have gradually returned to the formerly badly polluted rivers, and in many cases swim upstream

from the Forth into the tributaries of the River Almond, such as Breich Water, Marleston Water and Linhouse Water.

The trout found in the Almond are replenished annually at Linhouse Burn for West Lothian Angling Club; those in Cobbinshaw Reservoir are brought from hatcheries in Perthshire and elsewhere. Brown and rainbow trout, and a few pike, perch and eel are found in Cobbinshaw Reservoir, and perch in Hanny Quarry.

Flora

The Area is rich in flora in comparison with other aspects of natural life, partly due to the number of country estates cultivated in the seventeenth and eighteenth centuries. The best example is Pepper Wood, Carlowie (see Appendix B, Table 3.3). Most of the plants were brought from the Continent or from other parts of Britain about a hundred and fifty years ago. Unfortunately, the wood is overgrown and many of the plants are smothering the less hardy, equally rare ones. The only colony of yellow deadnettle (*Lamium galeobdolon*) in the east of Scotland is well-established here.

A few rare plants have been found around the site of Livingston House, where Sir Patrick Murray laid out his collection of over a thousand rare and unusual species in the seventeenth century. This collection later formed the nucleus of Edinburgh's first Botanic Garden.

The Area possesses Scotland's rarest plant (*Saxifraga hirculus* L.). This is the only place where it is known to flower.

In the Pentlands, near Cobbinshaw, there are one or two plants of *Trientalis europaea*, a species generally found only in the Highlands.

By the roadside near Carlowie, *Allium paradoxum* was introduced from the Continent by an Edinburgh nursery-man. Although it is common around Edinburgh, it is not found elsewhere in Scotland.

The district of West Calder is rich in flora, having at least three hundred and sixty three plant species. Torphichen and Broxburn have a variety of moorland flowers. The lower stretches of the River Almond and the banks of the Union Canal have a rich plant life. Ballyards Estate, once very rich in flora, has given way to marsh and woodland. On the bleak acid moorland to the south-east of the Area, *Dactylorhiza maculata* (spotted orchid) thrives reasonably well.

PROPOSALS

As country houses are vacated, they should be acquired for use as recreational centres, village colleges, social centres, convalescent homes, etc.

In areas of urban development where there are buildings of historic or architectural interest, due regard should be given to their preservation and incorporation within new layouts. In the rural areas such buildings should be included wherever possible within the Regional Recreational System.

Certain representative natural areas should be selected and preserved to encourage the growth of wild life. These areas should include still and running water, bogland, natural woodland and moorland.

Further research should be initiated into the factors affecting the ecological balance within the Area, to determine more precisely those sites most suitable for the conservation of nature.

SUMMARY

Survey

Traces of Neolithic Man, Celts, Picts, Romans, Angles and Saxons can be found in the Area. During the Middle Ages, Mid and West Lothian came under the influence of Normans and Flemings. From the departure of the Romans until about 1745, there was considerable political conflict in and around the Area. At about the middle of the eighteenth century, the Industrial Revolution encouraged the development of the Area's natural resources.

The urban settlements of the Area can be classified into rural and industrial communities.

There are two houses in the Area designed by Robert Adam: Newliston House, Kirkliston, and Balbardie House, Bathgate. Other important country houses are Calder House, seat of the Lords Torphichen (the Sandilands family), Kirkhill House and Murieston.

Scientific interests are mainly floral, including two rare species in the south and a wide selection of imported plants in the grounds of Carlisle Castle. Cobbleshaw and Harparrig Reservoirs have a good selection of wildfowl and fish.

Proposals

The buildings and sites of historic, architectural and scientific interest should be improved and safeguarded to play a wider and fuller part in the cultural and recreational life of the Area.

REFERENCES

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Chapter 4. AGRICULTURE

INTRODUCTION

Agriculture is the principal land use in the Area, and due to the location of mineral deposits has tended to become intermixed with industry since the Industrial Revolution. More recent urban growth has absorbed agricultural land, and future development in the Area will make further substantial demands.

This Chapter sets out the factors leading to the distribution of farming types, and makes proposals for its integration into the future Regional Landscape Pattern.

SURVEY

Distribution

The distribution of agriculture is shown on Map 4.1, 'Soil Fertility'.

Vegetation in the Area divides into two main groups; the cultivated area of the lower ground and slopes, and the uncultivated pasture and moorland of the hills.

The cultivated area extends mainly from the lower ground up to one thousand feet, and is the most extensive and important from the economic point of view. There are two main sub-divisions: the first, where wheat occurs in rotation, up to the four hundred foot contour and the line of thirty-two inch rainfall; the second, above this, to the one thousand foot contour where oats replaces wheat in the rotation.

Above the one thousand foot contour, there is very little cultivation because temperatures are low, rainfall is high, and the growth period is short. These areas are covered by grass, heather and gorse; in badly drained parts peat-forming mosses and plants predominate.

On the Pentland Hills, the grass on the lower slopes is generally good for pasture, but on the upper parts some of the pasture often has to be improved by drainage and partial cultivation. Other parts are of poor quality, merging into heather moor.

Peaty soil varies according to the degree of drainage, but has generally developed on the old Red Sandstone geological group of the Pentland Hills.

In the Area, glacial and marine sands and gravels and alluvia are the best agricultural land for market and nursery gardens. They occur on the areas of the former glacial lakes, e.g. around Kirkliston. Their value is high because they give rise to intensive cultivation. In the Area generally, these soils have been greatly enhanced by cultivation carried out over many generations.

Farming Types

(These are based on the Department of Agriculture's 1947 Economic Classification.)

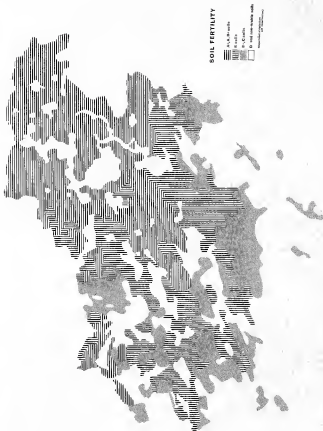
- 1 Minor Types
- 2 Intensive Livestock
- 3 Horticulture
- 4 Cropping
- 5 Dairying
- 6 Stock Rearing
- 7 Stock Rearing and Feeding
- 8 Hill Sheep

1 Minor Types

Smallholdings and part-time farms exist throughout the Area, especially in Uphall parish. There are a great number of these but the area they occupy is relatively small.

2 Intensive Livestock

These are smallholdings devoted almost entirely to pig and poultry production. They occur mainly around Uphall and Kirknewton, but are also found near most centres



of population. While there are few of these in the Area, they are becoming more specialised and important, and can be expected to continue to do so as the population increases.

3 Horticulture

This is extremely limited in the Area, due to competition from agriculture, and from more suitably placed holdings in Midlothian and East Lothian. At present there are a few near Uphall and in the western parishes. Their future in the Area seems to be limited to the outskirts of towns.

4 Cropping

This is carried out on the fairly intensively cultivated low ground arable farms where the production of crops for sale plays the major role in farm economy. It is found throughout the Area, especially in the north where it is dominant. It is sub-dominant to dairying elsewhere. Good soil and favourable topography are necessary. The usual rotation is of grass, oats, potatoes, wheat, turnip, barley; sometimes grass may be down for two or three years. Potatoes and barley are the crops which usually determine the profit margin.

Stock is kept mainly to maintain fertility. This may be done by buying medium-sized cattle in September-November and feeding them on roots, oats and hay. They are sold before May, or finished on new grass. Sheep may be bought towards the end of the Summer.

5 Dairying

This is the main farming operation in the Area, and is concentrated in the south-western parishes of Bathgate and Whitburn. In such intensively run farms milk represents at least thirty per cent of the gross output. Usually it is combined with the production of crops for sale as well as with crops for stock feeding. Winter feed is usually roots, hay, straw, oats and imported cake.

6 Stock Rearing

This type of farm is scattered throughout the Area, normally on land unsuitable for extensive arable farming. They are far smaller than the hill-sheep farms, and a large proportion of the land is under permanent grass. The main concern is rearing cattle and/or sheep, with less specialisation than other types. Oats and roots are fully maintained with the usual rotation of oats, roots, oats, grass, grass, grass; or, on lower ground, oats, potatoes or turnips, barley or wheat, grass, grass.

7 Stock Rearing and Feeding

These farms are found throughout the Area. They are more intensively run than stock rearing farms and are generally found at lower altitudes. The crops and rotations are the same, but more cropping is carried out to provide feeding for stock. Cattle and sheep are bred and store cattle are bought in late summer for winter feeding. Sheep are often grazed until early summer, then a hay crop is taken. Feeding stuffs need to be bought in for cattle.

These are extensive farms devoted almost entirely to permanent grass and rough grazing, found mainly in West Calder, with a few near Whitburn, Midcalder and Kirknewton. It is essentially marginal farming. Small areas of roots and oats are grown for winter feed, and some potatoes for home consumption.

The primary interest is the maintenance of permanent flocks of Blackface and Cheviots for the production of store lambs and wool. Cattle breeding has become an important subsidiary enterprise in recent years.

Further details of specific crops and livestock are given in Appendix C.

PRINCIPLES

While planning principles for agriculture in a Regional Plan are the same as for any other form of development, Agriculture is in the unique and unenviable position of being the only form of development to contract and suffer. If a plan is to be properly balanced, a positive and constructive attitude to agriculture is essential.

The Lothians Area contains some of the finest farming land in the country. It is unfortunate that the most fertile and climatically-favoured areas are also those most suitable for housing and industry; and the advantages of developing them are more obvious than considering less favourable areas. This results in the loss of much of the top quality land. It is often considered that bings and reclaimed areas are suitable for agriculture. In most cases, it would be far better if such areas were used for other forms of development, for which they are often very suitable. Most of the best land has been produced only through years of care and hard work.

Since much of the best scenery in the Area consists of rich, fertile fields, well-kept farms and buildings, and trim hedges, woodlands and trees, farmers may be subject to many troubles from the expanding population. The destruction of property and the increased danger to stock from dogs and vandals are some of the problems which may well arise. These can be very discouraging. Fields adjacent to expanding urban areas may be sold for development, leaving little incentive to spend time and capital on the upkeep of the soil, hedges or buildings. These factors can lead to untidy, run-down farms. As a result, the urban dweller loses visual amenity and respect for farming and the countryside.

PROPOSALS

The long term importance of agriculture as a land use must be considered very carefully. Positive planning for the long-term improvement of land is necessary. This can be carried out by extending the limits of the different qualities of land out into the adjacent poorer land. The aim should be to improve the latter to compensate for the good quality land lost in development of roads, industry and housing. This would involve a programme of cultivation, drainage and planting of shelterbelts.

Use of good quality agricultural land for other forms of development should be avoided where possible. There is a case for consideration to be given to agriculture, in order to preserve the amenity which it provides.

The expanded details of the Agricultural Proposals are included in Chapter 15 of this Report, 'Landscape Studies'.

SUMMARY

Survey

Agriculture is the principal land use in the Area. There are three main factors which decide the type of agriculture which occupies a given site: altitude - climate - type of soil.

These factors divide agriculture into two main groups: the cultivated lower ground, and the uncultivated pastures and moorlands of the hills. Within this overall grouping, eight types of agriculture are evident: Minor Types, Intensive Livestock, Horticulture, Cropping, Dairying, Stock Rearing, Stock Rearing and Feeding, Hill Sheep. Each type occupies those areas of land particularly suited to its needs.

Principles

Since good farming land is often suitable for building, as well as being ideal scenery, farmers will be subject to many problems from the expanding population. These may include trespassing and damage to stock and property. To safeguard the countryside for both food production and amenity, a positive and constructive attitude is needed.

Proposals

Wherever possible development on good quality agricultural land should be avoided. To compensate for the loss of good land, poorer land should be upgraded by a programme of drainage, cultivation and shelter planting.

REFERENCES

The following references have been quoted extensively throughout the Chapter:-

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Chapter 5. FORESTRY

INTRODUCTION

Neither County has ever supported forestry as a major industry. Its significance lies in its relationship to agriculture, and its effect on amenity and micro-climate. Forestry, together with the studies on Agriculture and Rehabilitation, forms the basis of the Regional Landscape Studies. The pattern of woodland ownership in the Area follows the national pattern; a slow change from private ownership towards more State maintained forests. Today, the Forestry Commission is the largest single managing body. In the Area, the Commission owns 1,985 acres, of which 898 are still to be planted. Of the 2,940 privately owned acres in the Area, 488 are being run under the Dedication scheme.

SURVEY

(We are indebted to the Forestry Commission for this part of the Chapter.)

On 30th September, 1947, the operative date of the 1947-48 Census of Woodlands, the area in woods of five acres and over in extent, within the boundaries of the Area, was 2,940 acres. From an examination of photoprints of the six inch Ordnance Survey maps concerned, it is estimated that there were a further 370 acres in Small Woods (those between one and five acres in extent) giving a gross acreage of 3,310 acres in woods of one acre and over. At the time of the Census, all woodland in the Area was privately owned. The distribution of woodland is shown on Map 5.1 'Woodlands' and Map 15.1 'Landscape Analysis'.

General

The pattern of woodland distribution within the Area is fairly typical of the central lowland belt of Scotland. The woods tend to be small and, although there are a few blocks of between one hundred and two hundred and fifty acres, the average is probably nearer twenty to twenty five acres. The larger blocks lie mainly north of the River Almond, where a considerable area exists in the form of policy woods; but a common feature of the whole Area is the complex pattern of shelterbelts. These belts, which are particularly prevalent in the West Calder and Kirknewton areas, vary in width from several chains to a few yards and, since any strips of woodland less than one chain wide were excluded from the Census, the Area is more heavily wooded than the above figures suggest. In the extreme south, the Area boundary embraces part of the Lanark Moors and the north-west slopes of the Pentland Hills; here, woodland consists of a few blocks planted primarily for shelter.

Distribution by Forest Type

Information on Forest Type distribution in 1947 is only available for the 2,940 acres in woods of five acres and over. The 'Small Woods' and 'Hedgerows' and 'Park Timber' were sampled in 1951, but the sampling intensity adopted was too low to give valid figures for an area as small as that under consideration. Table 5.1 shows the distribution of woodland by Forest Type for the parts of the Counties involved.

Table 5.1 Distribution of acreage by Forest Type, as on 30th September, 1947. Woods of five acres in extent and over.

	Part West Lothian	Part Mid- Lothian	Total	% of gross total
Coniferous High Forest	415	217	632	22
Mixed High Forest	111	44	155	5
Broadleaved High Forest	164	360	524	18
Scrub	392	300	692	24
Devastated	-	9	9	-
Felled	550	378	928	31
Total	1,632	1,308	2,940	100
Disafforested	88	4	92	

If we disregard the 92 acres which were classed as disafforested (areas which were shown as woodland on the six inch Ordnance Survey maps but which on inspection were found to have been converted to other forms of land use), then of the 2,940 acres remaining, fifty-five per cent lay in West Lothian and forty-five per cent in Midlothian; 1,311 acres, or forty-five per cent, were classed as High Forest with coniferous woodland predominating; 692 acres, or twenty-four per cent, were scrub; 9 acres were devastated, and 923 acres, or thirty-one per cent, were felled. The proportion under High Forest was lower than the overall average of the two Counties concerned, which corresponds closely with the Scottish National average. As expected from the lowland character of the Area, the acreage under broadleaved crops is considerably higher than the national average, but is again lower than the average for the two Counties.

Distribution by age class

The age class distribution of the 1,311 acres of High Forest is shown in Table 5.2, indicating a marked shortage of mature and overmature coniferous crops and of broadleaved crops under forty years of age.

Table 5.2 Distribution of High Forest area by age class, as on 30th September, 1947. Woods of five acres in extent and over.

Age Class	Coniferous High Forest	Mixed High Forest	Broadleaved High Forest	Total	% of total High Forest Area
1 - 10	47	-	-	47	4
11 - 20	36	5	-	43	3
21 - 30	192	5	-	197	15
31 - 40	150	-	8	158	12
41 - 50	136	44	13	193	15
51 - 60	69	32	8	109	8
61 - 120	-	30	350	380	29
121 +	-	-	123	123	9
Uneven aged	-	39	22	61	5
Total	632	155	524	1,311	100

Distribution by species

Table 5.3 Distribution of High Forest area by species, as on 30th September, 1947. Woods of five acres in extent and over. Acreage credited to principal species whether pure or in mixture.

Species	Classification			
	Pure	Dominant in mixture	Total	%
Scots pine	342	230	572	79
Corsican pine	-	9	9	1
European larch	11	15	26	4
Japanese larch	11	9	20	3
Norway spruce	24	48	72	10
Sitka spruce	8	17	25	3
	396	328	724	100
Oak	2	91	93	16
Beech	103	285	388	66
Sycamore	-	78	78	13
Elm	-	23	23	4
Poplar	-	5	5	1
	105	482	587	100

From the above Table, it will be seen that only Scots pine and beech are present in quantity in the Area, and these dominate almost three-quarters of the High Forest area. Of the remaining species, only Norway spruce, oak and sycamore are of importance.

Types of Woodland

Woodland can be divided into four types which have developed both naturally and artificially to meet different needs and to suit different environments. These types are shelter, plantation, estate and natural.

Shelter. Usually geometric in shape, shelterbelts are designed to protect crops and stock from the prevailing south-west winds. Thus the longer axes tend to run north-west to south-east, with variations to meet local conditions, field boundaries, etc. Slope is the commonest factor causing variation in orientation, but sometimes fields are totally enclosed.

Recent surveys in the Area indicate that shelterbelts were seriously reduced to meet the demand for timber in the two World Wars. Many



are overmature or devastated, and ineffective as windbreaks.

Plantation. Plantations are divided by species into coniferous, broadleaved or mixture stands. Those belonging to the Forestry Commission are almost exclusively coniferous. The Commission has purchased several areas around Livingston, Breich, Fauldhouse and Drumshoreland, and at Selin Muir, Kirknewton, has set up a forestry unit to take in hand felled ground in the Calder area.

In the Area as a whole, replanting of cut-over areas and establishing of new plantations is small in spite of existing areas suitable for afforestation southwest of Armadale and Whitburn, on the peat moorland near Fauldhouse and Polkemmet and in the Battgate Hills.

A number of landowners, including West Lothian County Council, have taken advantage of the Dedication of Woodlands scheme; Bangour Hospital woods are managed according to a Forestry Commission approved plan.

Estate. An extensive total area is covered with woodland in belts, blocks and clumps round the big country houses. Plantations were often established on what was considered in the eighteenth century to be the poorest land: sands, gravels liable to hard pan, and heavy boulder clays. This type is maintained for its aesthetic value, and for the cover it offers to game, besides maintaining privacy and shelter round the house. Planting is often of the more exotic and ornamental species: sweet chestnut, cedar, copper beech and rhododendron.

Although hedgerow and park timber only account for about four per cent of the Area's total volume, their visual effect is impressive. They occur in parks and fields in small groups, singly as specimen trees, and in long lines and avenues.

The immediate post-war period saw the break up of many landed estates, whose woods were often bought separately, felled and allowed to fall into dereliction.

Natural. The characteristic of natural woodland is the mixture of broadleaved species: beech, sycamore, ash, elm, lime, oak, alder, elder, birch and rowan may all be found on the one stand. Natural woodland tends to occur wherever grazing animals and cultivation are restricted. Only on severely windswept slopes and under adverse soil conditions may tree cover never occur naturally. Techniques of ploughing, sub-soiling, fertilising and the use of pioneer and nurse species are needed if growth is to be encouraged under such conditions. Roadsides and railway embankments not subject to annual cutting are sometimes wooded as a result of natural regeneration.

There is a tendency for woodlands to persist where other forms of land use are impracticable, such as on steep sided valleys, banks of streams, spoil-tips, bings and disused quarries. Such natural woodland has a significant effect on the amenity of the Area.

PRINCIPLES

The Factors Affecting Distribution

There are four main natural factors affecting the distribution and formation of woodland: climate, soil, topography and animals.

Climate. There is sufficient rain and a suitable range of temperature to support tree growth throughout the Area. The limiting climatic factor is wind, which, on the high upland areas, inhibits tree growth.

Soil. Trees will occur on practically any soil, given time. Since agriculture claims the best, tree cover is limited to areas where the soil is poor, thin, inaccessible, rocky or badly drained. The type of soil affects the species which will grow on it. Availability of nutrients, moisture content, physical nature, depth etc., are critical factors. Coniferous trees tend to be found on the acidic upland heaths, with deciduous broadleaved varieties on the lower Brown Earths, Boulder Clays and Alluvium. Toxicity can limit growth.

Topography. Steepness of slope is the most obvious topographical factor in the Area which produces tree growth. The hill or crag of volcanic origin is often associated with woodland in the Area. The thin soil cover and steep slopes due to erosion by ice make these hills impossible to cultivate. Similarly the steep sides of the Almond Valley and deep canal and railway cuttings become heavily wooded. Topography affects the drainage, producing a variety of soils and vegetation, from upland peat with birch to lowland marsh with willow.

Generally, the 1,250 foot contour is taken as the upper limit of economic tree growth.

Animals. After man, grazing animals, including deer and hare, probably exert the greatest influence on tree growth, by preventing natural regeneration and damaging young woodlands, but ants, squirrels and birds are important agents in seed dispersal.

Miscellaneous

Forestry can play an important part wherever public utilities need screening or protecting, for example, in the planting of catchment areas for reservoirs, sewage disposal works and electrical installations.

Some farmers are concerned about the possibility of trespass and damage by an increasing number of thoughtless visitors. This problem can be solved by careful design, with belts of trees planted in public open space forming green corridors from town to recreational areas. Such a system would have three main functions: it would protect farms from wind and people, produce timber crops and provide public open space of high amenity value.

If a park of any sort is to be implemented in the uplands, then a massive tree planting programme will be necessary for there are very few days, even in the summer, when cold winds are not blowing across them. Even winter sports grounds are improved by ever-green planting for shelter and amenity.

Forestry can make a significant contribution to the design of roads and car parks by using woodlands as shelters, deflectors to noise and headlights, canopies, screens and adds to road reading.

The unpleasant results of mining and quarrying may be minimised by judicious tree-planting. Spoil heaps and tips can be reclaimed and noise and dust from quarrying activities can be contained by screens of trees.

Within the pattern of moorland, a wide variation in distribution of trees is possible without fundamentally altering the character.

When forestry is used to provide a specific improvement, such as shelter, timber production, snow-barrier, screening and soil conservation, it should under good management also improve amenity and give a financial return.

PROPOSALS

The following proposals are expanded in Chapter 15, where they are related to Landscape Studies.

The Region's shelterbelt pattern should be repaired, replanted and extended.

Plans and programmes should be prepared for the shelterbelts in the Area to maintain them in a healthy and efficient condition.

Much marginal land should be devoted to afforestation, in conjunction with the improvement of agriculture. In the uplands, tree planting should be designed both to improve the hill sheep land, and to grow timber.

Green corridors of tree belts should be established to direct the public to recreational areas, and protect farmers from trespassers.

A tree planting policy is necessary throughout the Area to improve the amenity, especially in exposed areas and treeless settlements.

SUMMARY

Survey

The significance of forestry lies in its relationship to agriculture and its effect on amenity and micro-climate. West Lothian and Midlothian have never supported forestry as a major industry. The total area of woodland in the Area is 5,295 acres, or 6.2% of the total land acreage. The total area classed as High Forest (1947-48 Census) is 1,311 acres or 1.5% of the total acreage. (The National average for woodland is 6.6%). There are 3,884 acres of woodlands either plantation, scrub, felled or unplanted. The Forestry Commission owns 1,984 acres, of which 898 acres are still to be planted. There is a marked shortage of mature coniferous crops, and broadleaved crops under forty years of age, but a very high percentage (29%) of mature and overmature broadleaved trees. The average acreage of woodland blocks is between twenty and twenty-five acres, with a few larger blocks of one hundred to two hundred and fifty acres, mainly north of the Almond. Scots pine and beech dominate almost three-quarters of the High Forest area. Woodland exists in four main types: shelter, plantation, estate, natural. Shelterbelts account for the greater part of the woodland acreage, but many are overmature and devastated. Plantations of conifers have been established by the Forestry Commission at Selin Muir, Fauldhouse, Breich and Drumshoreland. Estate woodland is extensive throughout the lower parts of the Area and is a major scenic factor. Natural woodland occurs sporadically on uncultivated areas, derelict sites, embankments and riversides, and, with the estate woodlands, contributes to the local landscape quality.

Principles

There are four main factors affecting the distribution of woodland: climate, soil, topography and animals.

Climate. There is sufficient rain and a suitable range of temperature to support tree growth throughout the Area. Wind, and occasionally frost in small areas, are the limiting climatic factors.

Soil. The availability of nutrients, the right amount of moisture, and a suitable medium for root formation are essential. Toxicity can be a limiting factor.

Topography. Trees will grow on slopes too steep for agriculture. In badly drained areas only tolerant species like willow will succeed. The 1250' contour is generally the upper limit of tree growth.

Animals. Grazing animals are a hazard to tree growth.

Forestry can play a major part in improving the amenity of the Area. It can be utilized for the screening and protection of public utilities, urban development, roads, parks, rehabilitation of derelict land and for the improvement of the upland areas and marginal farming.

Proposals

The shelterbelt pattern should be repaired, replanted and extended, with plans and programmes to maintain them. In the marginal and upland farm areas, afforestation and agricultural improvement should be combined. Forestry should be used in rural areas to separate recreation from agriculture, and in the urban areas to improve the amenity and micro-climate.

REFERENCES

The following references have been used extensively in the preparation of this Chapter:

1. Grants for Woodland Owners. H.M.S.O. 1962.
2. Forestry in Scotland, H.M.S.O. 1962.
3. Britain's New Forests. H.M.S.O. 1962.
4. Census of Woodlands 1947-49, 3, 4, 5 - 5 acres and over.
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8. West Lothian - Physical, Social and Economic Survey, 1958.
9. Census 1961 Scotland. Population, Dwellings, Households, Counties of West Lothian, Midlothian and East Lothian.
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Chapter 6. MINING AND SUBSIDENCE

INTRODUCTION

This Chapter considers the physical implications of mining activities in the Area, and should be read in conjunction with Chapter 5, 'Industry and Employment', in Volume I of this Report.

Table 6.1 summarises the development of major minerals, and mining activities within the Area.

Mineral extraction, once the economic basis of many urban settlements within the Survey Area, has declined since the early twentieth century. The basic minerals mined were coal, oil-bearing bituminous shale and fireclay. Today, recoverable coal exists only along the north and east seams of the Limestone Coal Series (see Map 6.1), which are being extracted at four National Coal Board collieries and by two private companies.

During 1962, the shale oil industry ceased production and there is little likelihood of it recommencing.

Fireclay deposits remain in the Millstone Grit Series along old colliery workings of the Limestone Coal Group and are being mined by four companies (see Map 6.1 and Table 6.1).

SURVEY

Coal deposits within the Area form part of the East Central Coal Belt. The Productive Coal Measures were commercially mined for industrial and domestic fuel in the early nineteenth century. As a result of improved mining techniques, developed during the Industrial Age, the economic extraction of coal became possible in the Carboniferous Limestone Group.

Boghead Coal, a rich cannel, led to the development of Bathgate as a lubricating and lighting-oil distillation centre during the nineteenth century. The processing of cheap and abundant oil-bearing bituminous shale from the nearby Calciferous Sandstone strata founded the Scottish shale oil industry.

The collieries also extracted fireclay and ironstone. The former is still extracted from the Millstone Grit series and old colliery workings of the Carboniferous Limestone Group. Ironstone is no longer won for iron smelting.

The effect of mining within the Area is evident in cracked buildings, severed underground services, dead trees, marshes, 'sits' or potholes, and flooded areas (see Maps 6.2 and 6.3). Map 4.1 illustrates how land fertility has been reduced by mining.

PROPOSALS

These are defined in the right hand column of Table 6.1.



MINING RIGHTS

- ||||| AREAS APPROVED FOR COAL EXTRACTION
- ==== AREAS APPROVED FOR FRESHWATER EXTRACTION
- ||||| AREAS APPROVED FOR COAL AND FRESHWATER EXTRACTION

TABLE 6.1 DEVELOPMENT OF MAJOR MINERALS AND MINING ACTIVITIES WITHIN THE LOTHIAN REGIONAL SURVEY AREA

Geological Era.			
S I L U R I A N A G E	<u>Strata Activity to preceding 'Series' (I.L. - Intrusive Igneous; C.L. - Contemporaneous Igneous; S. - Sedimentation; C.M. - Crustal Movement). See Chapter 2.</u>		Extraction method, Subsidence and Building Precautions.
	<u>New Geological 'Series' formed. See Map 2.3 'Solid Geology', and Map 2.4 'Drift Geology'.</u>		
	<u>Geological 'Group' formed</u>		
	<u>Principal Mineral formed</u>	<u>Secondary Minerals formed</u>	
	<u>Mineral condition</u>		
S.	Silurian	The oldest rock strata underlying the Region originates from the 'Silurian' Age.	
C.M.	Lower Old Red Sandstone	Conglomerates and Sandstone.	
I.L.	Post-Lower Old Red Sandstone	Olivine-dolerite, Tschernite, Picrite, Analcite-olivine-dolerite.	
E.R.A.		Quartz-dolerite (sills and dykes.)	Quarrying outside Region at Norton and Craighton House.
		Other dolerites and basalts.	Quarrying olivine-tholeiite sill outside Region at Kalmes Hill.
S.	Upper Old Red Sandstone		

S.	Carboniferous Limestone	Lower Limestone	Limestone	The Limestone Coal Series has been, and will be 'worked'.	
				Good deposits; too much overburden.	Map 6, 1 shows the approved area of extracting any or all of the four workable Limestone Coal seams, ranging between the 600 and 1,800 ft. level.
				Coal	The maximum amount of subsidence following extraction is an estimated 7 feet.
				Shale	The horizontal surface subsidence draw is estimated to be 1/3rd seam depth, over and above the actual mined area.
				Areas already worked include the Balhardie Gas Coal, China Coal, Wood-muir Smithy Coal, Jewel Coal, Wilsontown Main Coal, Harlett Coal and the Kilsyth Coking Coal Seams. Four workable seams remain.	All structures, regardless of height, on likely subsidence areas, should not have a horizontal measurement exceeding 50 feet. Beyond this dimension parts of a building should be completely separated by a $\frac{1}{8}$ inch expansion joint.
				Ironstone	
				Sandstone	
				Shales	
				Limestone	
				Fireclay	
				Being extracted from the China and Jewel Coal workings, and Wilsontown Mains workings	
				Good deposits; too much overburden.	
				Few and thin seams	
				Thick seams	
				No longer quarried as road-metal; cannot withstand heavy traffic.	
C. I.			Basalt		

S.	Millstone Grit	Fireclay	Rich refractory fireclay is being extracted, mainly along the Glen, Drum and Bent Clay Workings.		<p>Map 6.1 shows the approved area of fireclay extraction by the two major companies. No subsidence is anticipated except at isolated points at or near the outcropping. Site investigations are required for all buildings sites above planning approved extraction areas.</p> <p>Open Cast - no subsidence.</p>
			Shale	Blaes only.	
			Coal	Few and thin deposits.	
			Sandstone	Coarse, grained; being quarried at Lervensdal.	
			'Gaulster'		
			Being worked in Lervensdal.		
U	Productive	Lower	Coal	Seams have been worked in the Fauldhouse/Armadale/Blackridge Area, from the surface to the 500 ft. level.	
P	Coal	Group		Areas worked include the Virtuewell Coal, Ladygrange Coal, Upper Drumgray, Mid Drumgray, Lower Drumgray Coal, Shotts Gas Coal, Mill Coal, Armadale Ball Coal, Armadale Mill Coal and the Colburn Coal Seams.	
P	Measures			The outcrops have been formed from weathered and glaciated anticlines.	
R					
C					
A					
R					
B					
O					
N					
I					
F					
R					
R					
U					
S					
			Sandstone	Sandy composition, others blue or black in colour.	
			Shale		
			Fireclay		
			Ironstone		

Open Cast - no subsidence.

All collieries have ceased operating in this Series.

No further subsidence from past working need be anticipated.

No further workings in these measures is anticipated.

R E C E N T	L. I.	Quartz-dolerite, Sills and East and West Dykes	of Permo- Carboniferous age.
A N D		Brick Clay	
		Boulder Clay	
		Shale	
		Sands and Gravels	Now being removed at S. E. Fauldhouse, East Bathgate and Kinnin Hill (outside Region).
P L E I S T O C E N E		Freshwater Alluvia	
		Peat	Extraction has taken place at Seafield; and peat is being processed at N. E. Fauldhouse.

SUMMARY

Survey

Economically recoverable coal seams are now almost exhausted. Production of shale-oil ceased in 1962. The effects of subsidence are evident throughout the Area. Further subsidence is not expected at or near mineral outcrops and present or future workings.

Proposals

Before development, reference should be made to Map 6.3, 'Subsidence', and surveys undertaken if necessary.

In areas where mining rights apply (see Map 6.1) no building longer than fifty feet should normally be permitted.

There should be no structures at or near coal or fireclay outcrops (see Map 6.3).

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- 6 Scottish Oils Limited.
- 7 Whittrigg Fireclay Company.
- 8 United Fireclay Products Limited.

MINERAL RECOVERY
SITES

SHALE OIL

- 1 former retorting unit
- 2 former refinery
- 3 former oil works
- 4 proposed material being recovered

COAL

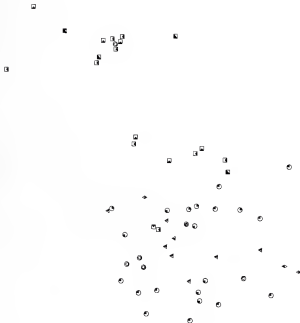
- 1 fully operating colliery
- 2 abandoned colliery
- 3 abandoned colliery still retained for ventilation
- 4 abandoned colliery not retained for ventilation

FIRECLAY

- 1 proposed and operating site
- 2 abandoned site
- 3 former waste

OTHER MINING ACTIVITIES

- 1 brickworks
- 2 sand processing works
- 3 other mineral extraction works
- 4 other



SUBSIDENCE

- NO SUBSIDENCE
EXPECTED
- AREA SUITABLE FOR
LIGHT STRUCTURES
- AREA REQUIRING
EXTENSIVE INVESTIGATION
- AREA UNSUITABLE FOR
BUILDING



Chapter 7. REHABILITATION AND CONSERVATION

INTRODUCTION

Three hundred years ago, the land use pattern of the Survey Area was primarily agricultural with a few home-spun industries in villages and farms. Since then, the Area has become disfigured by industrial remains and wastes associated mainly with the extractive industries. A comprehensive field survey and assessment of all the affected areas was an essential first step to the study covered in this Chapter.

Industrial dereliction within the Area has been divided into four main categories: bings and tips; quarries and pits; structures; disused communication lines and public services.

Details of each item are shown on Map 7.1 'Extent of Rehabilitation', Map 7.2 'Site Identification', and Appendix D, Tables 7.3 to 7.7. These Tables show that approximately two per cent of the Area (over 1,600 acres) is in need of rehabilitation. This is not the whole extent of the problem as site investigations have shown that bad drainage, subsidence and loss of amenity extend beyond the boundaries of the sites listed.

Since bings (a local expression for the piles of waste produced by the mining industries) constitute the major part of the rehabilitation problem, they have been examined in detail in this Chapter.

EXTENT OF
REHABILITATION

- DRAINAGE STRUCTURES
- ✓ DRAINAGE CHANNEL
- RAILWAY ROUTES
- BRIDGES AND TUNNELS

REHABILITATION SITE IDENTIFICATION

- PILES AND TIES
- STRUCTURES
- BRIDGES AND PYS
- COMMUNICATION AND SERVICE LINES

Numbering refers only to the sites in the rehabilitation schedule as shown in the appendices



SURVEY

Bings and Tips: Tipping Methods

The bings of spent shale and colliery waste form the most formidable part of the problem. They are composed of a variety of materials: oil bearing shale; waste chemicals and ash; colliery spoil; clay. As a result of different tipping methods, they are found in a variety of shapes.

'Hill and Hollow Formation' is the result of indiscriminate spreading of spoil from early coal workings, in undulating piles ten to fifteen feet high. 'The High Flat Topped Bing', sometimes rising to three hundred feet, resulted from side tipping trucks depositing shale around the upper edge of an elevated plateau.

'The Conical Tip' is formed when spoil is carried on an extendable inclined track, and dropped from a high discharge point. This method produces very steep slopes which discourage plant growth.

'The Fan Shaped Bing' had a number of tracks radiating from a central hopper.

'The Ridge Tip' is formed when spoil is carried on, and dropped from, an extendable horizontal track.

'Controlled Tipping' has been adopted on all new approved tipping sites since the Town and Country Planning Act, 1947. Considerable progress has been made in land improvement by controlled tipping techniques, including the use of dumper trucks to infill low lying ground.

Atmospheric and Waste Pollution

The bings within the Area cause pollution in four ways: by internal combustion, dust, water-erosion and leaching. The first two pollute the atmosphere; the second two, rivers and streams.

Colliery waste, having a high coal content, is liable to spontaneous internal combustion under certain conditions, the most important of which are the efficiency of the separating process and the methods of tipping adopted. Combustion can be prevented by efficient washing and screening of crude coal, followed by the continuous spraying of bings during tipping. The rehabilitation of burning bings requires digging out and spreading in thin layers.

Due to the continual weathering of shale, dust is formed, which is particularly prone to wind erosion, causing a nuisance to nearby urban settlements.

Water erosion of bings has continued within the Area for some time, particularly at the Addiewell Bing Complex. As a result, the weirs across the Breich Water and the River Almond require constant cleaning to remove shale sediment. Preventative measures include culverting, removal of spoil from embankments, diverting the stream and tree planting.

Chemical deposits in suspension have been found in the West Calder Burn, Bickerton Burn, Harwood Water, Foulshiels Burn, Killandean Burn and the River Almond from West Calder to its confluence with the Linthouse Water. The pollution discolours these streams and rivers and deposits ferric hydroxide on the river beds, having a lethal effect on aquatic life. The major source is at Baads Colliery, Mossend.

As a result of combustion at Harwood and Foulshiels Collieries, and the subsequent drenching operations, Harwood Water and part of West Calder Burn, Foulshiels Burn, Bickerton Burn and part of the River Almond are now contaminated.

A small subterranean stream, which could originate from the Niddry Bing, discharges toxic water at a point half a mile north of the A8.

Within the Area, the National Coal Board are carrying out experiments to control such pollution by sealing the wastes with clay, followed by top soiling and grass seeding. These experiments unfortunately have been only partially successful.

PRINCIPLES

Rehabilitation of industrial dereliction is necessary to help meet the demand for land on which to develop housing, industry and roads; to improve the amenities; to attract new industries and people; and to improve agriculture.

Plant Regeneration

The purposes of encouraging plant growth on shale bings are to provide a functional surface, to improve the appearance and to stabilize the shale. This can be achieved in three ways: by artificially covering the shale with soil or some other suitable medium, and sowing with grass and plants; by allowing the shale to weather and natural regeneration to cover the surface; by altering the bing's shape by spreading or re-moulding before preparing the surface for seeding. Plant growth depends on moisture, temperature, light, air and nutrients. Secondary factors affecting plant growth on shale include particle size, exposure, surface movement, slope, orientation, shale type and composition, rate of weathering, age of shale, humus content, damage by animals and vandalism.

Moisture

Since burnt shale is virtually non-porous, evaporation and percolation quickly dry the surface. Colliery wastes have a much better water-holding capacity, especially if unburnt shales and mudstones are present. The position and depth of a bing's water table, which is related to its shape, also influences moisture availability. A 'perched' water table within a bing may be much higher than that of the surrounding land. Orientation also affects moisture content, south-facing slopes being generally drier, due to greater solar radiation. Exposure to wetting and drying varies according to height and prevailing winds; the upper slopes and those facing south-west tend to be the driest.

Temperature

Each plant species has a temperature range, outside which it cannot survive. Many bing surfaces, particularly those facing south, heat beyond this range and measures must be taken to reduce the surface temperature. The temperature of the surface rises as the sun's angle of incidence nears a right angle; lower temperatures result when the slope is reduced.

Wind

Wind affects plant growth by evaporating ground moisture and desiccating plants. It also distorts plants by pressure, and by blasting with shale particles. Wind erosion of shale destroys the surface suitable for plants and also smothers them by drifting. The most affected areas are those facing the prevailing south-west winds and the upper slopes.

Slope

The angle of repose is a limiting factor in plant growth. Steep slopes, in addition to the higher temperatures and fast evaporation, are subject to continuous particle movement on the surface. This instability causes erosion on the upper slopes and smothering on the lower.

To 'spread' a bing in such a way that it is unobtrusive and can be used, entails a reduction of all slopes to as near horizontal as possible and never steeper than a gradient of one in forty. In remoulding schemes, the finished gradients should not be steeper than one in three.

Irrespective of bing type, method of tipping, chemical properties or physical characteristics, natural regeneration begins in sheltered stable areas. Similar conditions can be created artificially, by developing terraces, using metal shields round young trees, binding the surface with organic matter, or stabilising the surface mechanically.

After vegetation is established, livestock can be introduced, but grazing must be strictly controlled to prevent damage to pasture and young trees.

PROPOSALS

It is proposed that each of the listed sites (see Appendix D, Tables 7.3 to 7.7) be methodically landscaped, and that any surrounding non-productive land be reclaimed. Only in this way can the Area become more attractive to industrialist, urban dweller, agriculturist and tourist. It is further proposed that these sites be rehabilitated in order of priority.

Piecemeal rehabilitation cannot deal adequately with the vast problem of industrial dereliction; little is to be gained by treating one derelict site, if by so doing it reveals a more formidable derelict site beyond. Comprehensive rehabilitation overcomes this problem and has the following advantages: simplification of land acquisition; co-ordination of projects to be carried out by more than one authority; planning control of quarrying and other activities to accord with the final rehabilitation plan; appropriate re-use of land for recreation and leisure; integration of design with regional requirements; and economy in design in negotiations for land and grants, and in implementations costs, etc.

The method adopted to determine Rehabilitation Priority Areas was based on the following considerations in order of importance; derelict sites in, adjoining, or near new urban areas; dereliction adjoining and visible from the principal communication routes (motorways, trunk roads, main passenger railway lines, the airport and other classified roadways); proposed industrial sites and adjoining areas; projects which can be quickly and economically treated by 'cut-and-fill' or short-haul techniques (e.g. spreading bing material over water-logged land); and the co-ordination of bing extraction rights by different contractors into an intensive bing clearance or reformation programme.

Map 7.3 shows twelve Priority Areas containing most of the dereliction, and it is proposed that rehabilitation, with certain exceptions, should follow this pattern of priorities. These have been selected according to their relative contribution towards the achievement of the objectives recommended in the White Paper: 'Central Scotland. A Programme for Development and Growth', November 1963.

In determining the Rehabilitation Priority Areas, it has been assumed that all schemes already submitted to the Scottish Development Department which are within, or close to the existing urban settlements, have already received, or will receive, maximum 'Grant-Aid' for landscape treatment. Subsequent schemes associated with existing communities therefore have been given less importance, in favour of improvements to areas to which new population and industry is to be encouraged.



REHABILITATION
PRIORITY AREAS

ASDA BOUNDARY

The numbers within each priority
area relate to the numbers of
rehabilitation indicated in the

In addition to the Rehabilitation Priority Areas, there are some special items which should receive immediate attention:

- 1 Scattered derelict sites which can be dealt with quickly, at little cost, with a resultant rapid improvement of amenities.
- 2 Burning bings.
- 3 Bings which are polluting watercourses by erosion.
- 4 Bings emitting toxic salts.
- 5 Obsolete electricity cables and poles.
- 6 Bleak road verges and spoilt lands adjoining bings, neglected woodlands, derelict shelterbelts, and land affected by subsidence and poor drainage (planted to improve their appearance and to screen other items of dereliction to be dealt with at a later stage).
- 7 Reciprocal improvements, e.g. filling depressions from nearby bings.
- 8 'Face-lifting' treatment of existing urban settlements.

Derelict sites must be acquired by Local Authorities before rehabilitation can proceed, but, as a result of rapidly increasing purchasing costs, Local Authorities should be encouraged to acquire bings by compulsory order as early as possible. Grant-aid should be made available before preliminary schemes for rehabilitation are prepared in order to expedite purchasing procedures. Private quarrying of bings by contractors should not be discouraged but co-ordinated into a comprehensive bing-removal programme. A council-levied quarrying tax should be introduced to be spent only on associated landscape improvement schemes.

Maintenance is important in rehabilitation and a contingency sum should be set aside for this purpose in any rehabilitation contract.

SUMMARY

Survey

Dereliction, industrial and urban, is extensive throughout the Area. It can be divided into four categories: bings and tips; quarries and pits; structures; disused communication lines and public services. Details of each item found on the Regional Landscape Survey are shown on Map 7.1 'Extent of Rehabilitation', Map 7.2 'Site Identification', and in Appendix D, Tables 7.3 to 7.7. Approximately two per cent (over 1,600 acres) of the Area is covered by dereliction.

Bings are composed of four basic materials: spent oil shale; waste chemicals and ash; colliery spoil; and clay. As a result of different tipping methods, bings are found with the following forms: hill and hollow; high flat-topped; conical; fan; ridge; and 'controlled'. Bings cause atmospheric and water pollution in three ways: by internal combustion, erosion and water seeping from colliery bings.

Principles

Rehabilitation should be carried out for the following reasons: to help meet the demand for land on which to develop housing, industry, roads, etc.; to improve the amenities; to attract new industries and people; and to improve agriculture.

The rehabilitation of bings can be achieved in three ways: by covering the shale with soil or some other medium followed by sowing; by natural weathering and regeneration; and by spreading or reshaping before sowing.

The principal factors in the establishment of plant growth are moisture, temperature, wind and slope; other factors which affect plant growth on shale include particle size, exposure, surface movement, slope, orientation, shale type and composition, rate of weathering, age of shale, humus content, damage by animals and vandalism.

Proposals

Each of the sites listed in Appendix D, Tables 7.3 to 7.7, should be reclaimed by landscaping techniques and should follow the order of priority indicated on Map 7.3.

The following items of dereliction should be given immediate attention:

1. Scattered derelict sites that can be quickly dealt with at little cost.
2. Burning bings.
3. Bings which are polluting watercourses by erosion.
4. Bings emitting toxic salts.
5. Obsolete electricity cables and poles.
6. Derelict shelterbelts and neglected woodlands.
7. Ground depressions in need of filling.
8. Decaying existing urban settlements.

Compulsory powers should be exercised by Local Authorities to acquire bings, and a controlled, co-ordinated bing removal programme should be introduced, with a council-levied quarrying tax for associated landscape improvement.

Note

Some of these proposals are incorporated and expanded in Chapter 15, 'Landscape Studies'.

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19. Nature Repairs. A Report to Her Majesty's Development Commission on trials by Michael Graham, published by Roneo Ltd., March 1962.
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Chapter 8. POPULATION AND HOUSING

INTRODUCTION

This Chapter discusses first the distribution of the 1985 target population of 130,000 persons within the Region, outwith the New Town; then goes on to outline the building programme needed to house the population, and the density at which the programme should be implemented.

SECTION 1: POPULATION

Survey Material

Population studies for the Lothians Region were undertaken in Glasgow University, and Chapters 3 and 4 of Volume I discussed in detail estimates of size and structure of the population to be housed in the Region by the end of 1985. These studies embraced the whole Region and touched briefly on the distribution. Variations in the structure of the population in different parts of the Region make the determination of a proportional breakdown (employing rates of growth and age structure of the overall estimates) somewhat inaccurate. However, while appreciating that accurate data on population change can only be made available by constant and careful study at Local Authority level, the physical planners consider that a proportional breakdown is valuable as a broad guide.

The growth of population in the planning areas known as Town Groups has been assessed on the basis both of Regional rates of growth, and known housing proposals. This has enabled a further estimate of permissible immigration to be produced.

The physical planners have formed the opinion that the scale of house building arising out of Local Authority programmes, and private development, has been such as slightly to increase the population in early 1986 over that given in the Volume I studies which were based on events to the end of 1963. This has the effect of decreasing the Area's capacity to take further immigrants after that date, assuming the late 1985* stated target of 130,000 persons outside the New Town remains. The population residing outside the New Town in 1966 has been estimated to reach 107,400 persons in twenty years by natural increase. This is referred to as the 'existing' population.

The 1985 population resulting from immigrants to the Region outwith the New Town after 1966, and their natural increase, is referred to as the 'immigrant' population. The difference between the target population of 130,000, and an 'existing' population of 107,400 is therefore the total 'immigrant' population and amounts to 22,600 persons. Projection I, Volume I, on which the physical planners' studies are based, assumes a regular flow of immigrants. It is, however, likely that a higher level of immigration to the Region outwith the New Town will occur in the early years as a result of both 'overspill' agreements and private development and that this inflow to the smaller settlements will slow down when the New Town develops to provide a stronger attraction. The Immigrant Model Growth Tables in Volume I can be used to determine a flow varying in each quinquennial period resulting in a total 'immigrant' population of 22,600 persons in 1985. A suitable inflow of immigrants on this basis is given in Table 8.1.

Table 8.1 Number of Immigrants Entering Region outwith the New Town

1966 - 1971	7,000 persons
1971 - 1976	8,000 persons
1976 - 1981	2,000 persons
1981 - 1986	1,000 persons

* In accordance with the convention adopted in Volume I, calculations are based on quinquennial periods from the Census year of 1961, but, for ready comprehension, the end of the plan period is referred to as 1985.

The resultant estimate of total population of the Region outwith the New Town at five-yearly intervals is given in Table 8.2.

Table 8.2 Total Estimated Population at Five-Yearly Intervals

1966	.....	88,000 persons
1971	.....	100,000 persons
1976	.....	113,800 persons
1981	.....	122,400 persons
1986	.....	130,000 persons

This population must be accommodated within the Region outwith the New Town. Its distribution throughout the Area differs in some details from that outlined in Volume I, due to subsequent study of the capacity of the various Town Groups based on physical surveys of land availability, subsidence, aspect, accessibility, and environment.

Principles of Distribution

The physical planners have from the outset accepted the concept of a group of mutually accessible settlements of varied size and character and seek to encourage the growth of the largest existing settlement in any Town Group in order to achieve the concentration of a wide range of social and public services in a location convenient to the majority of the population. The physical planners have, therefore, recommended the largest population increases in towns nearest to Livingston New Town.

Figures given for individual Town Groups are not intended to represent more than a broad indication of one possible pattern of growth. Many factors will intervene to alter the pattern; failure to arrest emigration of the existing population from the Region, for instance, would seriously hinder attainment of the target populations. Constant review of the developing situation by Local Authorities is essential to ensure that the balance of growth outlined in the distribution model is achieved.

Provision must also be made for regular review of the proposals before and beyond 1985, to take account of the continuing growth of the population after that date. Volume I states that this growth could raise the 1986 population by twenty five percent in 2001 A.D. Since the New Town should be able to support substantial urban sub-centres in the Region by the eighties, present proposals are designed to accommodate the additional growth in a few towns only.

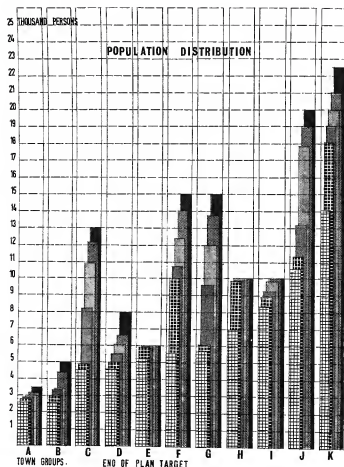
Proposals for Distribution

Diagram 8.1 illustrates the distribution of population according to Town Groups. The significance of these proposals for each Town Group is discussed below:

MID & EAST CALDER is considered likely to double in size by 1975. Most of the development should be for middle-income housing, with a small allocation at Kirknewton. A decrease in immigration in the later stages of the plan would prevent the population from increasing beyond the target of 15,000 persons by 1985.

WEST CALDER/POLBETH Town Group is expected to grow quickly to accommodate immigrants in close proximity to Livingston New Town. The population is therefore likely to more than double by 1975 and then to grow largely by natural increase to reach the target of 13,000 persons by 1985. When rehabilitation of nearby bings has reached maturity, Mossend can be expected to attract to this Town Group immigrants in the middle-income range.

ADDIEWELL is a Town Group where detailed design studies have led the physical planners to conclude that rather more than a rounding-off, infilling scheme should be implemented. The valley



A	KIRKJUNSTON / NEWBRIDGE	3 500 PERSONS
B	WINCHBURGH	5 000
C	WEST CALDER / POLBETH	13 000
D	ADNEWELL	8 000
E	FAULHOUSE	6 000
F	BLACKBURN	15 000
G	MID / EAST CALDER	15 000
H	WHITBURN	10 000
I	ARMADALE	10 000
J	BROXBURN / UPHALL	20 000
K	BATHGATE	22 500
L	ECCLESMACHAN	20 000

	1961
	1966
	1971
	1976
	1981

DIAGRAM 8.1

separating the present communities has such high environmental potential that sufficient population should be encouraged to its vicinity to take full advantage of this asset. Some internal regional movement should be allowed in a building programme designed to reach its maximum in the later stages of the plan, when other settlements will be restricted in their development for a variety of reasons. This will bring the population to 8,000 persons in 1985.

FAULHOUSE Town Group is not recommended as a potential area of expansion by Professor Robertson owing to its distance from the Greater Livingston complex. As the capacity of the services is limited to 6,000 persons, the physical planners consider that rounding-off and infilling would be appropriate. A house building programme related to redevelopment will be expected in this location after the population reaches its target in the late sixties.

WHITBURN Town Group is adversely affected by mining subsidence and proposed roads. This is reflected in the decision to regard it as 'static' after it has reached its target population of 10,000 in 1970.

ARMADALE Town Group can grow steadily for some years but by 1980 it should have reached its desirable limit. Its exposed situation makes it an unattractive location for expansion beyond a population of 10,000.

BATHGATE Town Group is considered unsuitable for extensive expansion of residential development by Professor Robertson. Recent private development and proposals by the Local Authority are likely to bring the population to 18,000 persons by 1966, and as discussions of further development are reaching fruition it is considered desirable to increase earlier estimates to 22,500.

BLACKBURN Town Group has increased rapidly in recent years and is residentially attractive and well placed in relation to employment and to Livingston New Town. Natural increase of the young immigrant population will be rapid and the building programme, on completion of the present 'overspill' schemes, should be mainly planned to accommodate the small-scale internal regional movement which will occur as other settlements reach capacity. This type of development would bring the population to 15,000 by 1985.

BROXBURN/UPHALL Town Group has been proved by design studies to have a development potential in excess of the 25,000 persons quoted by Professor Robertson. This high potential for expansion could be fully utilised in the period 1986-2001 when there would be scope for a reorientation of the town by introducing new distributor roads and central facilities on land to the north of existing development. These physical planning considerations have led to the view that development up to 1985 should be related to a gradual change in the function of the A899 from a through route to an internal spine road serving a limited development of 20,000 persons, which could include over 4,000 immigrants.

ECCLESMACHAN should only expand if a new village for upper-income 'executives' in the vicinity of the existing village is implemented. This could occur at any stage of the plan, but since the proposal is a Regional growth stimulant, implementation should be encouraged in the early years. The population might then reach 2,000 by 1985.

WINCHBURGH Town Group should grow mainly by natural increase in the initial stages of the plan, but sites reserved for expansion could come into use around 1975, when the necessary alterations to main services could be accomplished to serve the target population of 5,000. Professor Robertson stresses the potential of this

location for Linlithgow-Edinburgh commuting, when the adjoining shale-waste bings have been rehabilitated.

KIRKLISTON/NEUBRIDGE Town Group is expected to grow mainly by natural increase. The proposed figure of 3,500 persons in 1985 allows some immigration to permit infilling and rounding-off.

SECTION 2: HOUSING

Survey Material

The Minister of Housing, Mr. Richard Crossman, was recently quoted as saying: "Although in towns there had been some successes in building houses which were both beautiful and good to live in, much rural development was appalling. Urban houses were planked down on the fringes, or worse still, in the centres of the villages" (1).

This has been the misfortune of many settlements in the Region; in only a few cases has new development been of the quality of the recently built flats near the A899 at Uphall, or the 'split-level' houses at Winchburgh which are of a high standard of design. Proposals now under consideration for Bathgate and Blackburn also show great promise.

Information on condition of existing housing is available in Chapter 14, 'Urban Settlements', and it is sufficient to note here that the majority of the houses have been developed by Local Authorities or by Scottish Special Housing Association; that over 2,000 dwellings can be expected to be below acceptable standards by 1985; and that existing residential densities vary little.

There is no surplus of vacant habitable houses in the Region to accommodate the proposed population increases, and a substantial building programme will therefore be necessary.

Housing Programmes

Estimates of housing need in Volume I, Chapter 15, are obtained from figures of population and household size. Table 8.3 shows the number of households in the Region outwith the New Town, derived from the Household Size Tables given in Volume I with adjustments to suit the breakdown of 'existing' and 'immigrant' population in Town Groups.

Table 8.3 Estimated Numbers of Households outwith New Town

	1966	1971	1976	1981	1986
Population	88,000	100,000	113,800	122,400	130,000
Household size	3.36	3.38	3.41	3.42	3.43
No. of households	26,200	29,600	33,400	35,800	37,900

Each household does not have a separate house, since some of the population is in hotels, hospitals, or institutions and Volume I, Chapter 15, makes an allowance of two per cent of the total population on this account in the area outwith the New Town. Clearance programmes of dwellings which fall below acceptable standards will involve demolition of approximately six per cent of dwellings standing in 1966 and this must also be considered. In addition, to permit mobility, an allowance of three per cent has been made for vacant dwellings.

- (1) The Planning Bulletin: Report of speech at R.I.B.A. from The Guardian, 26.11.64.

An estimate of total dwellings required in each quinquennial period, and the annual requirement of dwellings in each five-yearly phase, is rounded-off in Table 8.4.

Table 8.4 Total House Building Programmes outwith New Town

	1966-71	1971-76	1976-81	1981-86
Total No. of dwellings	3,700	4,350	2,800	2,500
Annual No. of dwellings	740	870	560	500

This Table reveals the need for an ambitious house-building programme to keep pace with the natural increase and falling household size of the 'existing' population, and with the new 'immigrant' population.

Most of these dwellings will be built by Local Authorities, but a number will be privately developed for middle and upper-income immigrants. The demand for this type of housing should develop rapidly with the growth of the Region. It is known that a demand exists, and a study of suitable areas suggests that it would be reasonable to allocate sites for the accommodation of 10,000 people in privately developed housing. Demands in excess of this allocation should be absorbed by the New Town where areas are to be provided for this type of development.

Table 8.5 Private House Building Programmes outwith New Town

	1966-71	1971-76	1976-81	1981-86
Total No. of dwellings	850	975	475	250
Annual No. of dwellings	170	195	95	50

Only a fifth of the total house-building programme, outwith the New Town, is allocated to the private sector, although the population housed may represent a quarter of the total additional population.

The size of the programme has been established; the density at which it is disposed within the Town Groups will affect the lives of many people, and justifies attention.

Proposals for Density of Development

Existing densities in the Region are neither high nor widely varying, the greatest intensity of recent development occurring at seventy persons per acre. New developments in the Town Groups should be mainly low-rise at a density below this figure for a number of reasons: the need for precautionary measures in areas liable to subsidence; availability of land does not encourage intensive development; houses with gardens are preferred by families, particularly in areas of private ownership; rounding-off and infilling schemes with dwellings of improved space standards are required; and a more fully motorised society is anticipated.

These factors have led the Regional Consultants to assume average densities of fifty persons, or fifteen houses, per acre in areas of proposed residential development, with allowances for considerable local variation. At these densities, the housing programme would require the reservation of between nine hundred and one thousand acres of land.

SUMMARY OF PROPOSALS

The proposals for desired distribution of the population throughout the Town Groups in 1985 can be summarised:

Mid and East Calder	15,000
West Calder/Polbeth	13,000
Addiewell	8,000
Fauldhouse	6,000
Whitburn	10,000
Armadale	10,000
Bathgate	22,500
Blackburn	15,000
Broxburn/Uphall	20,000
Ecclesmachan	2,000
Winchburgh	5,000
Kirkliston/Newbridge	3,500

Attainment of these levels of population in 1985 will require a building programme of 13,350 dwellings, of which some 2,550 can be expected to be developed privately.

Development of this programme at fifteen dwellings per acre will require the reservation of nearly 1,000 acres of land.

Chapter 9. INDUSTRY

INTRODUCTION

The Government White Paper 'Programme for Development and Growth, 1963' incorporates "the conception of growth areas chosen as potentially the best locations for industrial expansion" and goes on to state that "The development of these areas will be fostered by providing for them, in accordance with a coherent plan, all the 'infrastructure' services".

For the economic planner almost any place within the whole of the Lothians Region growth area once provided with the appropriate 'infrastructure' will be an acceptable location for any kind of industry (Volume I, Chapter 5); but for the physical planner some parts of the Region will be preferable to others on account of greater ease of linkage to this 'infrastructure', availability of reasonably level sites, reduction of nuisance, and so on.

This Chapter, after describing the survey information on existing industry, and trends in employment and land use, establishes the scale of the necessary provision of land and locates within the Region sites of adequate size and suitable characteristics to ensure that the achievement of growth of industry and employment is not inhibited for any physical reason. The proposed sites are illustrated on the Advisory Master Plan for the Lothians Region.

SURVEY

Existing Industry

A great deal of factual material on the industrial structure of the Region is available in the Development Plan documents of the two Counties. Substantial changes have occurred since these documents were prepared, the most important being an acceleration in the rate of decline in the extractive industries, and the establishment of a number of factories of unprecedented size. The largest, the British Motor Corporation factory, was opened in 1962 on a site of one hundred acres, and now provides employment for 4,500 people. A survey of types of industry and levels of employment in the Region contained in Volume I, Chapter 5, assists in supplementing the material in the Development Plans to provide the following outline of the present situation.

The extractive industries which were formerly the major source of employment have declined rapidly, and there are now only half a dozen fully operational collieries in the Region although several fireclay mines exist, and fireclay reserves remain to be worked near Fauldhouse, Armadale, Whitburn and Blackburn. A sandstone quarry and two sand pits remain in operation, and peat processing continues at Fauldhouse. 'Quarrying' of the vast spent-shale bings in the Region is however on the increase. These activities can be located on Map 6.2, 'Mineral Recovery Sites'. The scale of change can be gauged from the one hundred derelict structures, one hundred and fifty major bings and tips and twenty eight quarries and pits listed in the survey of eyesores, all relics of past operations.

The extractive industries are not as closely associated with manufacturing industries in the Region as in the past. Much of the fireclay is taken to plants beyond the Region and even to England. The principal local manufacturer using fireclay is at Armadale. Sand from the Fauldhouse area is used in glass making and cosmetic manufacture but not within the Survey Area.

Bathgate, Armadale and Broxburn/Uphall are the main industrial centres in the Region. The Bathgate and Armadale sites are near major services such as the Region's gas governor station at Armadale, the Region's electricity grid substation at Bathgate, and the railway marshalling yards at Bathgate, and contain most of the heavy industry in the Region. Iron and steel founding, sheet steel manufacturing, materials-handling engineering, motor vehicle manufacturing and brick making are all represented. Employment for women is available in the manufacture of electric condensers and hosiery. The Broxburn area has several firms connected with the construction industry, a thread works, a large heat-exchange engineering works, a book-binding firm, and electrical concerns. Food processing is of increasing importance in this location where water supplies are good; there is one meat processing factory and nearby a potato crisp factory is under construction on a seventeen acre site.

Elsewhere in the Region subsidiary industrial sites are in use. These include the detergent works and brick works at Pumpherston; paper mills on the River Almond; food processing at West Calder; distilling at Kirkliston; pallet making at Winchburgh, and poultry processing and joinery at Newbridge. Switchgear is to be made in an Advance Factory at Whitburn and another Advance Factory is to be built at Polbeth. Spun concrete pipe manufacturing is commencing at Addiewell on a fifty acre site near a new bonded warehouse at Muirhall; and at the north-eastern fringe of the Region a one hundred acre site is being developed by a rubber company.

PRINCIPLES

Employment Trends and Land Use

The employment force in the Region in 1961 exceeded 26, 000 persons. In Volume I of this Report it is estimated that this will have increased to 100, 000 persons by 1985 due to increases in the population and in the rates of participation for both men and women. The proportions of the employment force in primary, manufacturing and service industry are expected to be roughly 5%, 50%-60% and 40%-50% respectively. These figures make no distinction between the New Town and the remainder of the Region since people living outside the New Town may work within its boundaries, or vice versa. It is assumed that sufficient work will be available within the Region for the whole of the working population, though in practice some people will travel out of the Region to work and others will travel into the Region to work.

Thus the Region with a total population of 230, 000 persons in 1985 could require jobs in manufacturing industry for up to 60, 000 persons. Some additional employment in the service sector will occur in industries with land-using characteristics similar to those of manufacturing industry, e. g., utility services, haulage and transport undertakings and large scale warehousing.

One of the Region's greatest assets in attracting new industry is the availability of large areas of suitable land, and this has already encouraged some industries to move from congested sites in Edinburgh. In these circumstances the density of workers per acre used in any calculation of land requirements need not be affected by considerations of pressure for space. Volume I has suggested twenty workers per acre as a reasonable figure on the basis of current experience in new towns. This represents the upper limit of manufacturing needs. At this standard the Region would require three thousand acres. Some four hundred and fifty acres are already in use, and a further seven hundred and fifty acres are allocated in the Livingston Master Plan. Allowing additional land for service industries the Region outwith the New Town will require up to two thousand three hundred acres.

The figures used here are tentative and will require verification by constant study of the needs of incoming industries to ensure that appropriate provision is made at all stages of the Plan.

Site Selection

The selection of sites for industry is complex, but the more important factors which have been considered in allocating industrial sites in the Plan can be summarised:-

Accessibility: sites should be accessible to existing or proposed regional roads, railways and airports, and should be so located as to encourage dispersal of traffic movements, to avoid congestion during periods of journey-to-work travel, and ensure ease of movement for materials and goods.

Services: sites should be located where there are existing services, or in areas where the 'infrastructure' can be readily tapped.

Land Form: generally sites should be sufficiently level to permit development with a minimum of earth-moving, and large enough to accommodate extensive factories and car parks.

Quality of Land: the land should have adequate bearing capacity, and not be liable to subsidence from old, new or proposed mineral workings. Whenever practicable, areas requiring rehabilitation should be considered in preference to the best agricultural land.

Environment: sites with defined physical boundaries related to surrounding landscape should be of sufficient quality to attract both industrialist and employee and should be capable of development without adversely affecting environment.

PROPOSALS

The Sites Selected

With the site factors outlined above in mind, study of the Region led to selection of a number of areas suitable for industrial development. The areas consist of three large sites of three hundred and fifty acres or over, and three subsidiary sites of one hundred and fifty acres or over. The main sites are at Bathgate, Pumpherston and Murieston, and the subsidiary ones at Armadale, Broxburn and Bellsquarry. The sites at Pumpherston, Murieston and Bellsquarry abut the boundaries of Livingston and are equally accessible from within or without the New Town.

The Bathgate site totalling six hundred acres extends southwards from B. M. C. to Whitehill, north of Blackburn, and westwards to Mossdale. This is a reasonably level site with excellent access to rail and road communications including national routes. The Whitehill sector will be particularly accessible to women workers from nearby Blackburn. The Armadale site is an extension of the Bathgate area where heavy industries are already concentrated.

The Pumpherston site is an extension of the existing area of the detergent works and covers three hundred and fifty acres. The area is in urgent need of rehabilitation and some work will require to be carried out in advance of industrial development by reshaping of bings and planting of parts of the site. Pumpherston is close to Houston where the New Town's first industry, Cameron Iron Works, is under construction. The site can readily be serviced, and its location near the New Town makes it suitable for intensive users. The subsidiary area east of Broxburn/Uphall is already taking shape with construction of the potato crisp factory. Further rehabilitation is needed in the vicinity and a contractor is at present quarrying adjacent bings for road-making materials. This site is well located in relation to future communication routes and is suitable for concerns using large quantities of water as it is near the Union Canal which carries industrial water, supply lines which will be fed from the Loch Lomond scheme, and proposed sewage disposal works.

Murieston, some five hundred acres on the southern fringe of the New Town, is of different character. Variations in levels are greater and the site could be suitable for a number of uses which might be unsatisfactory if located close to residential areas. The nearest residential areas in the New Town are separated from the site by a belt of trees. The dramatic qualities of some large scale industries could be exploited here. Bellsquarry, the smaller site west of the New Town, has been included in Midlothian County's proposals but not yet developed.

The six sites total two thousand two hundred acres, of which some nineteen hundred and fifty acres remain undeveloped. Along with existing and proposed sites elsewhere in the Region including the New Town this should be adequate for the needs of the Region.

Basis of Location of Industry on the Sites

Certain guiding principles can be stated as the basis of location of industry on the selected sites:

- 1 The densest industries in terms of workers per acre should be

located nearest to the largest population groupings, and conversely, the least dense industrial uses located furthest from these groupings.

- 2 The female employing industries should be located near potential sources of labour, e.g. Whitehill, near Blackburn.
- 3 The noxious or unsightly industries should be located where least damage will result to the environment.
- 4 Whenever possible factories with similar characteristics should be developed simultaneously so that sites may be laid out as spacious planned industrial estates having adequate provision for car-parking, canteen and social amenity buildings and recreation space. A high standard of working environment in accordance with the principles of environmental planning outlined for the Town Groups in Chapter 14 should be the objective.

SUMMARY

Survey

The industrial structure of the Region is in process of diversification, and substantial areas are required by incoming industries: this is of great significance in considering the future needs of the Region.

Principles

Employment in the Region in manufacturing industry may be required for up to 60,000 persons by 1985, and the upper limit of land needed for this purpose can be taken to be one acre per twenty workers. Some service industries will have site requirements similar to manufacturing industries. The total land needs for industry in the Region should not therefore be in excess of three thousand five hundred acres.

The selection of sites for industry should be based on considerations of accessibility, availability of services, land form and quality, and environment.

Proposals

The sites safeguarded for industrial use in the Region should total three thousand five hundred acres, of which two thousand seven hundred and fifty should be outwith the New Town.

The main sites should be located at Bathgate, Pumpherston and Murieston, with subsidiary sites at Armadale, Broxburn and Bellsquarry.

The location of industries on particular sites should be dependent on the traffic generation potential, the type of employment offered, and other characteristics of the industries.

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Chapter 10. COMMUNITY SERVICES

SECTION 1: EDUCATION FACILITIES

Introduction

This Section deals briefly with the existing framework of Scottish primary and secondary levels of education and then sets out the results of a survey of the Region's existing educational facilities in table form. Chapters 3 and 4 of Volume I give estimates for 1985 of population, family structure, and age distribution characteristics; and from these estimates the physical planners have determined various standards for the provision of schools within the Region. By reviewing proposals for existing facilities suggested by the relevant Local Authorities, it has been possible to calculate the additional number of school places which will be required by 1985. Work commenced on the Region as a whole, then was followed by more detailed study of towns, schools and school sites. While overall figures for the total number and type of schools required within the New Town of Livingston have been calculated on the basis of the population estimate for the Region as a whole given in Volume I and shown herein, this is as far as the work has been taken in respect of the New Town itself. For the Area's towns, the proposals have been taken one stage further by making precise recommendations for all school sites in each town. These sites are shown on the Advisory Plans for the principal settlements in the Town Groups, and the numbers shown on the sites correspond to those allocated to schools on Map 10.2 and in Appendix E, Table 10.2

In addition to proposals for both primary and secondary schools, this Section makes brief reference to other forms of education facilities likely to be required in the Region by 1985. These proposals range from nursery school to adult and higher educational facilities.

SURVEY

Educational System

Responsibility for the educational system is entrusted to the County Councils, though each is obliged by statute to delegate administration, but not finance, to an Education Committee to whom the respective Education Department is responsible. This service takes over thirty per cent of the Council's finances and is therefore its major expenditure item. Specific grants are obtainable from the Central Government to help subsidise educational facilities and capital expenditure. Counties are obliged to provide adequate primary, secondary and further educational facilities for their respective populations. They are responsible for staffing schools, enforcing attendance, and providing school transport, hostel accommodation, bursaries, milk, school meals, and child guidance and school health services. Special arrangements are made for the schooling of handicapped children and for adult education. Libraries and youth employment are other aspects of the Counties' educational responsibilities.

The framework of the Scottish educational system (1) is as follows:- it proceeds from the Nursery School (3-5 years) to the Infants' Department (5-7 years) and thence to the Primary School (7-12 years), at which point there is a break; at about the age of 12 the pupil is tested in various ways - oral, written, psychological - and proceeds either to a Junior Secondary School (12-15 years) or to a Senior Secondary School (12-18 years). The distinction between Junior and Senior Secondary Schools is not clear-cut in all cases but the former is intended for the pupil leaving school at the statutory school-leaving age, the latter for those intending to go into professions or higher branches of commerce and industry.

Existing Facilities

The location and type of educational facilities existing within the Survey Area are shown on Map 10.1 and further details of these schools are given in Appendix E, Table 10.1. In Volume I of this Report, further details of existing school places, etc., are given (2); it has been pointed out that both County Authorities already had plans for a major reorganisation of their school facilities prior to the designation of the Livingston New Town and before the Lothians Regional Survey and Plan commenced. This school building programme has been estimated at £3.6 million (3) and involves several major changes in the distribution and character of the Region's existing educational facilities. For this reason, apart from reporting on the size and location of the Region's existing educational facilities, it is not intended to discuss them at length in this Chapter. In Chapter 14, 'Urban Settlements' further reference has been made to the existing school facilities.

PRINCIPLES

Future Requirements

General: In Volume I (4), it was stated that "the provision of school education in the Survey Area is not a matter which raises important economic issues". In the physical planning of the urban settlements, however, educational facilities are a major land use so that the proper planning and estimation of these becomes a matter of some importance.

In estimating the future educational needs of the Survey Area, we have taken into consideration each of the following major factors:

- 1 Estimated Future School Population. (Based on figures suggested in Volume I, Chapters 3 and 4.)
- 2 Standards of School Provision. (Based on discussions with both Education Authorities concerned and normally accepted standards.)
- 3 Existing Educational Facilities. (i.e. their capacity, siting, suitability for retention, etc. and the Education Authority's plans and recommendations. This data was collated from discussion with both Education Authorities.)

Factors 1 and 2 are considered more fully in the following sub-section, and the standards adopted and used in formulating our proposals for the future educational requirements of the Survey Area are shown there.

Estimated Future Numbers of Pupils and Schools

The 1985 target population for the Region (including both areas in West Lothian and Midlothian, but excluding the New Town Designated Area and its population) is 130,000. This figure includes 107,400 persons, being the anticipated natural increase in the Region's existing population with an average household size by 1985 of 3.33 persons per household, and 22,600 persons, being the anticipated number of immigrants and their natural increase with an average household size of 3.99 persons per household. Combining these two figures gives a 1985 total of some 37,900 households for the 130,000 people, or an average household size of 3.43 persons/household.

On the basis of these figures and data supplied to us from our Glasgow colleagues on the age distribution of both existing and immigrant population, we have calculated the number of children in the various age groups within the Region in 1985, as follows:

i	5-11 years old	=	17,020
ii	12-15 years old	=	9,265
iii	16-17 years old	=	4,350
Total			30,635

In age group ii the range from twelve to fifteen years of age inclusive has been selected to allow for the anticipated increase in the school leaving age from fifteen to sixteen. This increase is expected to be in force by 1970. Age group iii, therefore, consists of children who have attained school leaving age. If it is assumed that the number of this oldest group who will remain in school doubles from 1961 to 1985, (i.e., of sixteen and seventeen year old children, 20% and 12% respectively attended school in 1961, and it may be assumed that by 1985 these proportions will have advanced to become 40% and 25% respectively), then the above estimates may be modified as follows to indicate the number of school places required by 1985, viz.:

primary school pupils (5 - 11 years)	=	17,020
secondary school pupils (12 + years)	=	10,570

On the basis of data supplied by the Scottish Development Department, these figures may be further split into non-denominational and Roman Catholic school pupils, as follows:

	Non-denominational	Roman Catholic	Total
primary school	12,950 (76%)	4,070 (24%)	17,020
secondary school	8,140 (77%)	2,430 (23%)	10,570

From these figures for pupils and the Region's total number of households in 1985 (i.e. 37,920), the following standards have been derived:

1,470 households =	500 non-denominational primary school pupils
4,550 households =	500 Roman Catholic primary school pupils
4,550 households =	1,000 non-denominational secondary school pupils
16,700 households =	1,000 Roman Catholic secondary school pupils

The above standards have been used in determining the total number of school places required by the various towns in 1985, shown in Table 10.1.

Table 10.1 sets out the probable primary and secondary educational facilities required by 1985 but it is necessary to draw attention to certain aspects of the Table. First, the calculations themselves are based on population 'estimates' for the year 1985, and, in order to build up a continuing and increasingly accurate picture of the number of school places required within each Town Group, it will be necessary to revise the present population estimates at least on a quinquennial basis. Second, the 'average' figures used in the calculation of school places will obviously be subject to correction at a more local level when local differences in age, family composition and religious character are taken into consideration.

Finally, it is necessary to mention the wave-like movement of the population's age distribution and its effects, and the immigrant policy which has been proposed for each Town Group. Some Town Groups have nearly reached the proposed population target as a result of natural increase and/or immigration, so that in some cases and especially where there is a predominance of young families, it is likely that a greater number of school places will be required in the early phases of the Plan than have been proposed for 1985. This situation may lead to overcrowding of existing facilities, and the Local Education Authority concerned will need to ascertain both the probable duration of this 'peak' and the appropriate action required.

Table 10.1 Calculations for Total Educational Facilities (Primary and Secondary) required by 1985

Town Group	1985 Population Target	Households 3.43 p. p. h. by 1985	Primary (streams)		Secondary (1000 pupils)	
			N. D.	R. C.	N. D.	R. C.
Bathgate	22,500	6,550	9.0	3.0	1.44	0.39
Broxburn/ Uphall	20,000	5,830	8.0	2.5	1.28	0.35
Armadales	10,000	2,920	4.0	1.3	0.64	0.17
Whitburn	10,000	2,920	4.0	1.3	0.64	0.17
Fauldhouse	6,000	1,750	2.5	1.0	0.38	0.10
Blackburn	15,000	4,380	6.0	2.0	0.96	0.26
Winchburgh	5,000	1,460	2.0	0.6	0.32	0.09
Kirkliston/ Newbridge	3,500	1,020	1.5	0.4	0.22	0.06
Ecclesmachan	2,000	580	0.5	0.2	0.13	0.03
West Calder/ Polbeth	13,000	3,790	5.0	1.7	0.83	0.23
Mid and East Calder	15,000	4,380	6.0	2.0	0.96	0.26
Addiewell	8,000	2,330	3.0	1.0	0.51	0.14
New Town*	100,000	25,100	49.0	16.0	7.30	2.40
Total	230,000	63,010	100.5	33.0	15.61	4.65

* New Town average household size by 1985 = 3.99 (5)

Note: Under the present provision of the Education Act, a 'stream' is taken as being seven normal classrooms plus one special classroom for backward children. The maximum permissible number of pupils per teacher is forty-five for normal pupils and twenty-five for backward pupils. This means that a one-stream school has a maximum capacity of 340 pupils. By reducing the number of pupils per class to a more manageable 30-32, however, the optimum capacity of a one-stream school may be 250 pupils and that of a two-stream school, 500 pupils. This optimum figure has been used in calculating the streams required by 1985 as shown in Table 10.1.

PROPOSALS

Nursery Schools

"Under the Act of 1946, it became the duty of Education Authorities to provide education in nursery schools and classes where sufficient children, where parents desire such education for them, could be enrolled to form a school or class of a reasonable size." (6) In Volume I of this Report (7) an estimate has been made for the number of nursery school places required by 1986. This is a very conservative estimate and suggests that by 1986 provision might be made for only 470 pupils or one pupil to every 490 persons. In the proposals for the new town of Hook, it was suggested that nursery school places might be provided on the basis of one pupil to every twenty-five persons. (8)

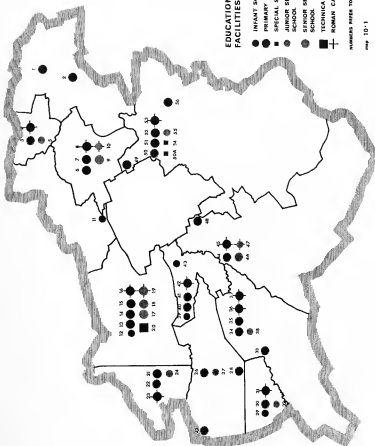
In proposing suitable standards, reference has been made to the recommendations of the Recreation Planning Advisory Committee (Chapter 13) where it has been suggested that four acres of children's

EDUCATIONAL FACILITIES 1964

- INFANT SCHOOL
- PRIMARY SCHOOL
- SPECIAL SCHOOL
- JUNIOR SECONDARY SCHOOL
- SENIOR SECONDARY SCHOOL
- TECHNICAL COLLEGE
- ✚ ROMAN CATHOLIC

NUMBERS REFER TO TABLE 10-1 ABOVE

map 10-1



park space should be allocated for every 2,500 persons. Because of the current situation where the nursery school building programme is subordinated to the more pressing needs of primary and secondary education, it is proposed that where there is a future demand for nursery school facilities, sites may be taken for this purpose from the parks shown in the Advisory Plans. Because of their prior zoning as recreation spaces, these sites will be well integrated into the residential footpath system and the access to them will be safe and convenient.

Primary Schools

From Table 14.1 in Volume I, it will be seen that the present number of primary school pupils in the Region is approximately 9,500, while estimates for 1985 suggest that there may be some 17,000 primary school pupils in the Survey Area, excluding the New Town. The estimated number of primary 'streams' required for each Town Group by 1985 is shown in Table 10.1.

In determining the number, size and location of new schools required within each of the various Town Groups (see Map 10.2, and Appendix E, Table 10.2), we have had the full co-operation of the two County Education Authorities.

It is estimated that, excluding approximately thirty-two new primary schools required by Livingston New Town, an additional thirty new primary schools (twenty three non-denominational and seven Roman Catholic) will be needed in the Area by 1985. This figure allows for, but does not include, maintaining with possible modifications about twenty four existing primary schools, i.e. seventeen non-denominational and seven Roman Catholic, as well as the abandonment of about fifteen existing primary schools. In December 1964, there were two primary schools under construction within the Region: a new Roman Catholic primary at Polbeth and a new non-denominational primary at Uphall; therefore, approximately twenty-eight new primary schools will be needed in the Region by 1985 (excluding some thirty two new primary schools in the New Town). Of these, fourteen will be two-stream and fourteen one-stream schools. The large number of one-stream schools is required mainly to cater for the smaller towns in the Survey Area. Of the thirty-two new primary schools required by the New Town of Livingston, thirty-one will be two-stream and one may be a one-stream school.

The total of all new primary schools for both New Town and Region is therefore as follows:-

two-stream primary	=	45
one-stream primary	=	<u>15</u>
Total		60

Secondary Schools

From Table 14.1 in Volume I, it will be seen that there are approximately five thousand secondary school pupils in the Region, and it is estimated that by 1985 there will be some 10,500 secondary school pupils in the Region, in addition to 9,500 in the New Town Designated Area (see Table 10.1). The estimated number of pupils in each Town Group in 1985 is shown in Table 10.1. These estimates are based upon the standards assumed and previously explained.

Apart from Kirkliston and Ecclesmachan, all the regional Town Groups support some form of secondary school facilities. Because there are fewer Roman Catholic pupils, Roman Catholic secondary school facilities can only be provided at four of the twelve Town Groups, in addition to those required in the New Town of Livingston. Both

Local Education Authorities have extensive proposals and construction programmes for these schools. New senior secondary schools are nearing completion at Bathgate and West Calder. Another senior secondary school is under construction at Armadale and work on two more will commence shortly at Whitburn and Blackburn.

Including the three schools now under construction at Bathgate, West Calder and Armadale, eight senior and six junior secondary schools will be required in the Region by 1985 apart from the ten senior secondary schools required in the New Town. Three existing senior secondary schools (Broxburn, St. Mary's, Bathgate, and West Calder High) will be retained, but ten other existing schools providing secondary education will be abandoned (see Appendix E, Table 10.1).

The total number of new secondary schools for both New Town and Region by 1985, excluding the three already under construction, is therefore as follows:-

senior secondary schools	=	13
junior secondary schools	=	6
Total		21

Further Education

A Technical College nearing completion at Bathgate will provide facilities which are now provided for the Survey Area by Edinburgh and Falkirk. This College will provide for approximately one hundred and fifty full-time and eight hundred and sixty part-time students.

Volume I (9) suggests that it is improbable that this College will be able to meet the needs of the Survey Area for very long, since it was originally planned to cater for the existing regional population of 1964. Additional technical college facilities for the increase in regional population must therefore be provided, and it is recommended that land for this purpose should be allocated within the New Town of Livingston. A site of about twenty acres will be required and this should be located in relation to transportation facilities, and preferably in the New Town Centre.

Higher Education Facilities

Volume I of this Report (10) states that it is unlikely that an institution of university standard will be required within the Survey Area because the Universities of Edinburgh and Glasgow and the proposed Stirling University are all within easy access, and because the 1985 Survey Area population will not provide enough higher education entrants to warrant the establishment of a 'local' institution.

Based on estimates of the seventeen year old age group of 1985 and the suggested percentages for 'home initial entrants to full-time higher education' (Robbins Report) (11) for 1985, it would appear that by then approximately four hundred students per year from the Region (including the New Town) will be seeking entrance to a university and a further four hundred students per year will be seeking entrance to other higher educational institutions. While these figures indicate that it will not be necessary to provide higher educational facilities within the Survey Area, it is recommended that a site of at least one hundred acres be reserved within the New Town (preferably in the Central Valley Area) for the possible future provision of a higher educational institution.

Adult and Other Educational Facilities

Adult evening classes are generally held in secondary schools and

the new schools planned for the period to 1985 should be adequate to cater for additional demands.

In Volume I (12), attention was drawn to the need to establish adequate labour training facilities within the Area. While the training of school-leavers to take their place in commerce and industry is very important, some local retraining centres will also be necessary to cater for the large number of adult workers. It is recommended that Bathgate should be selected as a centre for this purpose. Bathgate is a favourable location, being closely associated with the nearby industrial complex centred on the British Motor Corporation factory and the equipment and teaching facilities of the New Technical College.

The provision of special schools for backward and mentally handicapped children is largely the responsibility of the Education Authorities who generally provide one classroom for backward children for every seven other classrooms, and it is suggested that this standard be maintained. Occupational centres for more seriously handicapped children will need to be provided in relation to the increase in the regional population. The Survey Area's existing occupational centre is situated at Midcalder in buildings which leave much to be desired. There is a special need for occupational centres to have the best possible environment with spacious grounds and privacy. A desirable site of some ten acres is available at Midcalder for this purpose and it is recommended that this be used for the development of a new residential occupational centre.

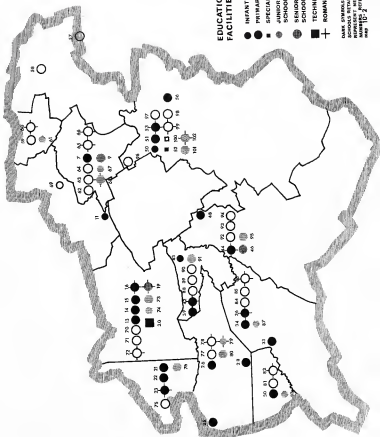
Conclusions

The most important factor to emerge from this study is the size of the educational building programme required for the Survey Area's Town Groups, as compared with that for the New Town. While the New Town will ultimately accept about sixty to seventy thousand immigrants, and grow from a few thousand in 1961 to one hundred thousand by 1985, the surrounding Survey Area (with an intake of only 22,600 immigrants) will increase from about eighty thousand in 1961 to one hundred and thirty thousand by 1985. On the basis of these figures, it might be supposed that most of the educational building programme would be concentrated in the New Town. This, however, is not the case, for the existing schools in the Town Groups require almost complete replacement and the Local Education Authorities had a major rebuilding programme in hand before the designation of the Livingston Growth Area. The present comprehensive plan for regional growth has necessitated a complete re-appraisal of educational development programmes, which must now be divided almost equally between the needs of the New Town and those of the remainder of the Region.

EDUCATIONAL FACILITIES 1985

- INFANT SCHOOL
- PRIMARY SCHOOL
- SPECIAL SCHOOL
- JUNIOR SECONDARY SCHOOL
- SENIOR SECONDARY SCHOOL
- TECHNICAL COLLEGE
- ✚ ROMAN CATHOLIC

DARK SYMBOLS REPRESENT EXISTING SCHOOLS RETAINED, LIGHT SYMBOLS REPRESENT NEW SCHOOLS.
NUMBERS REFER TO TABLE 10-2 APP. 2
10-2



SECTION 2 : HEALTH FACILITIES

Introduction

This Section deals with the two main Health Services provided within the Survey Area; a. Hospital, Medical and Institutional Facilities; and b. Health and Welfare Services. It surveys existing conditions and makes proposals for additional facilities required to serve the increased regional population.

SURVEY

a Hospital Services, Medical, and Institutional Facilities

Hospital services within the Region are operated by the Scottish Home and Health Department and are run by the South-East Scotland Regional Hospital Board. West Lothian County facilities are administered through the West Lothian (Bangour) Hospital Management Committee, and Midlothian County facilities through the Edinburgh Central Office.

Hospitals

At present, there are three hospitals in the Survey Area, each controlled by the West Lothian (Bangour) Hospital Management Committee. These are:

Bangour Hospitals. One of the largest hospitals in south-east Scotland, it provides a full range of hospital services for general, specialist and mental patients. The General Hospital has 616 beds, while the Bangour Village Hospital (Mental) has 1,116 beds (13). At the 1961 census, the resident population of Bangour Hospitals was about 1,700 (staff and patients), and it has been estimated that there would be a day-time staff population of about 850. This figure includes day-help staff. Before the designation of the New Town at Livingston, the Hospital Board was planning to replace the General Hospital on a site probably in Bathgate. It has now been agreed that this new General Hospital will be sited at the Livingston Town Centre. At the time of writing, the New Town Corporation has plans for a 600 bed hospital which will require a staff of over 1,000. It is intended to commence construction on this project by 1970 and a twenty-five acre site has been reserved for this purpose. It was intended originally that this new hospital would replace Bangour, thus making expansion of the existing geriatric and mental hospital facilities practicable there.

Tippethill Hospital. This hospital of 76 beds is situated to the north of Whitburn and is used at present for the treatment of both general and chronically ill patients.

Drumshoreland Hospital. This hospital lies to the south-east of Broxburn and provides 35 beds for general patients.

Nursing Homes, Homes, Other Institutions and Services

There are homes and institutions catering for the welfare of various sections of the community in both Counties, although the majority and more diverse of these services are provided in Edinburgh, thus serving the greatest population. These include nursing homes, mental homes and homes for the physically handicapped. One institution within the regional boundary is:

Linburn Home. A home for the war-blinded, situated near Wilkieston, which is administered by the Royal Blind Asylum and School Board.

Ambulance Services. The ambulance service is the responsibility of the Regional Hospital Board. The headquarters are in Edinburgh, but ambulances are provided at three centres within the Region: Dalhousie, Fauldhouse and West Calder.

General Practitioners and Others

Doctors. The present ratio for Scotland is about 1:2,000 population and the 1961 Annual Report of the Scottish Medical Practices Committee stated that in their opinion all areas in Scotland were adequately served by doctors. There are doctors in fourteen centres within the Region and, assuming an existing population of about 70,000, this would make the ratio for the Region 1:2,100.

Dentists. The ratio of family dentists (on the Executive Council's list) to population in the Lothians and Peebles Executive Council area is about 1:5,900 (14). Scotland's figure is 1:4,900. It is felt that a ratio of 1:4,500 is desirable and that therefore the existing number of dentists in the Area is approximately five short. Dentists practise in the following seven centres in the Region: Bathgate - 3, Armadale - 1, Whitburn - 1, Fauldhouse - 2, Stoneysburn - 1, Broxburn-Uphall - 2, and West Calder - 1.

Chemists. The ratio of retail chemists to population in the Executive Council Area is 1:3,270. Scotland's figure is 1:3,189 and this provision is therefore adequate.

b Health and Welfare Services

In addition to the Health Services provided by the Regional Hospital Board and general practitioners, the two County Councils as Local Authorities are responsible for a comprehensive range of statutory health functions, which include the care of mothers and young children, midwifery, health visiting, home nursing, prevention of illness, the home help service, health education and certain aspects of mental health.

Maternity and Child Welfare Clinics. There are seventeen such centres provided in sixteen of the regional towns. Midlothian has provided its own staff for these centres, while West Lothian pays general practitioners to carry out these clinics. Ante-natal clinics are staffed by general practitioners and by local authority midwives.

Old People's Homes. An old people's home, Limesfield House, is situated near Polbeth. It was opened in 1955 and is administered by Midlothian County Council. Almondvale, near Blackburn, is an old people's home administered by West Lothian.

School Health Services. In both Counties there is a fully comprehensive school health service of County Council medical, dental and health visiting staff. As a result of routine inspections, health defects in children are diagnosed at an early stage and preventive

measures taken. School meals are provided in infant and primary schools, and in some cases are delivered by 'schools meals' distribution centres. In due course this service is to be abandoned as each school is equipped with kitchen facilities.

Other Services. The two Councils also provide other services, such as domiciliary midwives, home nursing sisters and health visitors, many of whom have cars. A special health visitor deals solely with cases of tuberculosis, and mobile radiography units are used for early detection of the disease.

PROPOSALS

Hospital and Medical Services

Based on Table 14.2, Volume I, (15), the additional population in the Survey Area by 1985 of some 150,000 persons would require the following hospital beds:

Acute beds	@	2.5/thousand	=	375
Maternity beds	@	0.69/thousand	=	120
Geriatric	@	1.60/thousand	=	240
Mental	@	1.60/thousand	=	240

Assuming that the proposed Livingston General Hospital would replace the existing Bangour General Hospital and that the disused facilities at Bangour would allow for the expansion of the geriatric and mental services, it would appear that the expansion planned for the Region will generate the need for a further 500 general hospital beds. These estimates are based on ratios derived from the White Paper 'Hospital Plan for Scotland' (16).

To some extent, it may be possible to offset the increased needs of the Region by rationalising the needs of the areas served by the hospitals in east central Scotland. However, should a further hospital be required in the Survey Area, this should be sited at Bathgate.

Estimates of the numbers of additional medical and dental staff required by the increase of population in the Survey Area are given in Chapter 14, Volume I. In physical planning terms, these essential services do not require specific land use allocations, because most doctors and dentists will require little more than normal surgery facilities. Where groups of doctors and dentists combine to provide medical centre facilities in town centres, provision for their needs has been included in proposed land requirements set out in Section 3 of this Chapter (Shopping and Central Area Provision).

Health and Welfare Services

The provision and expansion of health and welfare services to meet the needs of the Region's increasing population is a matter which must be resolved largely by both Counties. Generally, the facilities in the old towns are good, but the concentration of new population in Livingston New Town will require special measures if facilities are to be provided in phase with population growth, and maternity and child welfare clinics for example may have to be provided initially in schools.

The 1985 build-up of population in the Town Groups, although not great, will require the expansion of some facilities and the addition of others. Maternity and child welfare clinics will be needed by the young immigrant population and their provision should be treated as a matter of priority.

Summary of Proposals

The report on hospital facilities is concerned with the replacement of the General Hospital at Bangour by a new General Hospital at Livingston. The additional population proposed for the Region in 1985 will require the provision of approximately 500 extra beds. Whether this demand can be met by existing programmes is a matter to be determined by the Scottish Home and Health Department in conjunction with the local Hospital Boards, but should it be found necessary to provide any facilities in addition to those already planned, it is recommended that they should be established at Bathgate.

It is emphasised that the demand for the more general health and welfare services provided by the Local Authorities will be substantially increased by the youthful character of a large proportion of the immigrant population. It is therefore recommended that, where these facilities are underprovided, both Counties should acquire and reserve sites for these purposes at the earliest possible date.

SECTION 3 : SHOPPING AND CENTRAL AREA PROVISION

Introduction

The pattern and distribution of the Region's existing towns and their service centres is a result of the original industrial associations of the communities. In many of the towns, residential groupings are closely associated with mining pit heads. Today, with the change in the Area's industrial bias, mines have been closed and many towns are now no longer associated with a mine. Commuter communications have developed, and following the closure of the mines many marginal shops have been forced to close due to lack of trade. Some towns have been fortunate in their location on major transport routes, and secondary industries have been encouraged to develop. By this process Bathgate has become the regional centre for a large proportion of the population within the Survey Area.

SURVEY

A survey of existing shopping facilities within the Lothians Region was undertaken during the first half of 1963 (17). Each town and settlement was visited and details of its shopping facilities recorded. In classifying shops according to the various trades, the Board of Trade's Standard Classification of Retail and Service Trades was used (24).

Throughout the survey, details were recorded of the estimated sales-area of each shop, and an estimation and grading was made according to its physical condition. The sales-area was taken as being that area devoted to the sale and display of goods and did not include storage and office space. The physical condition of each shop was assessed according to the following scale:

Grade 1 Shops built or extensively remodelled since 1950.

Grade 2 Older shops which, while not necessarily having had recent extensive modifications, were still maintained in good physical condition.

Grade 3 Shops which had fallen into a state of disrepair; houses which had been converted unsuccessfully into shops, and other buildings of a temporary nature used as shops.

Details of shop ownership and organisation were also collected and classified into three main categories: independent, multiple and co-operative.

Survey Results

Eight hundred and twenty shops were distinguished in this survey and many of them were found to group into centres of various sizes (see Appendix E, Table 10.3). The largest, Bathgate, has 171 shops, while the smallest, Wilkieston, has only one. A total of thirty centres were distinguished by analysis which also revealed Bathgate to be the regional shopping centre. Seven urban settlements: Armadale, Whitburn, Blackburn, Fauldhouse, West Calder, Mid and East Calder, and Broxburn/Uphall were classified as small town centres; and the remainder as village centres. The following sub-sections briefly describe the shopping facilities found in each type of centre.

Regional Centre - Bathgate

Bathgate has 171 shops with a total shopping sales-area (as distinct from total shop area which includes office and storage space) of about one hundred and twenty thousand square feet, which is about 48% of the total shopping floor space provided in the whole of the Survey Area. Multiple and co-operative traders command about 65% of the town's total shopping sales floor area, which indicates the specialised nature of the shopping facilities provided. Shops within the centre have a larger average size than those in other centres in the Region. Some have as much as sixteen thousand square feet of sales-area, while the average size of shop throughout the whole town is nine hundred square feet. The average size of shop (sales-area) throughout the Region is only three hundred square feet.

The shopping centre is adjacent to the main traffic artery (A89), and is tending to expand into poor quality residential areas. It is close to an omnibus depot serving the Region with frequent buses linking with most of the existing towns. A haphazard mixture of land uses, 'through' traffic, and inadequate parking facilities seriously affect the general quality of the centre, although a substantial number of new and improved commercial developments are occurring. At the time of the survey, 26% of shops were classified as Grade 1, 42% as Grade 2, and the remaining 32% as Grade 3.

A Report published by the Bathgate Burgh Council (25) refers to a peak demand on Fridays and Saturdays for three hundred and twenty car parking spaces within the town centre which is inadequately served by kerb-side parking. The Report recommends vehicular-pedestrian separation within the centre, with provision for adequate off-street parking. The task of replanning Bathgate's commercial centre has recently been given to planning consultants.

Small Town Centres

In these centres food retailing space occupies 35% of the total retail sales floor area. The average population of the seven towns is 6,600. Shops are smaller than in Bathgate (average size being two hundred and fifty square feet sales-area) and the independent trader holds a strong position in their organisation and ownership (89% of all shops). There is a full range of convenience goods shops together with a few durable goods shops.

Most of these centres are linear in form and located on either side of the towns' main streets. The service access to the shops is generally

from the main road so that service vehicles, together with customer car parking and pedestrians combine to create chaotic traffic conditions.

Village Centres

Some twenty one villages in the Area have an average population of 1,000, although some communities are much smaller. The centres have an average of some five shops, with an average shop size of about two hundred square feet of sales-area. Independent traders hold a strong position, in spite of some co-operative shops using mobile vans. Most shops specialise in food and other essential goods but a number of 'general stores' also provide a small range of household goods. Although the physical condition of these shops varies a great deal, the majority are Grade 3.

PROPOSALS

General

Volume I of this Report (18) estimates that by 1985 a total shop area of some 2,100,000 square feet will be required for the population of the Region, about 1,100,000 square feet of this amount being allocated to the New Town of Livingston. This estimated area is intended to include all retail trades as defined by the Board of Trade's Census of Distribution and other Services, as well as some other service trades (see Table 11.3 in Volume I). It does not include allowances for other central area uses such as banks, post offices, public houses, travel agencies, opticians, garages and service stations. In this Section, therefore, it is proposed to define the central area functions excluded from the estimates and to propose land use standards for the central areas of the towns and villages within the Region.

Bathgate, Whitburn, Blackburn and Broxburn already have town centre redevelopment schemes under consideration and it is assumed that all the small towns within the Region will also be improved by central area development, appropriately programmed to meet the needs of the increasing population.

As the function of each town varies according to the size of its population and its location relative to other towns in the Region (particularly the New Town of Livingston), so will the facilities and land requirements appropriate to each centre vary considerably, and it is therefore only practicable to assess these requirements in broad terms at this stage.

Shopping Space in Central Areas

Table 11.8 in Volume I estimates a total shopping floor area of some 2,100,000 square feet. In this Chapter shopping floor space has been allocated to the various towns according to the estimated needs of the population for convenience goods shopping only, and it is proposed that most of the durable goods shopping should be provided in the Livingston Town Centre. Details of the shopping floor space allocation are shown in Table 10.2 which takes into account deductions necessary for existing shopping (see over).

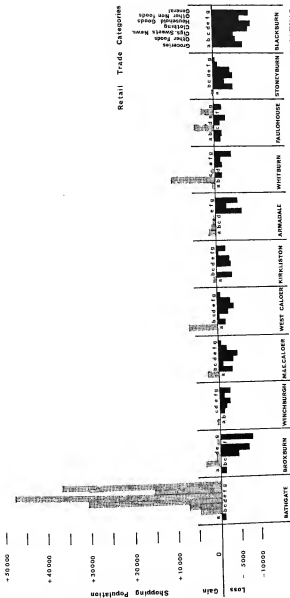
The distribution of shopping floor area on a population basis disregards such factors as accessibility to Livingston New Town Centre or proximity to other large shopping centres both inside and outside the Survey Area. Armadale, Whitburn and Blackburn, for example, will remain under the influence of Bathgate even beyond 1985. However, as central area space actually used by shopping is in the order of 20% of the total central area, a fair degree of latitude is built into the proposals. In making these proposals, it is anticipated that further research and analysis will be carried out before any redevelopment proposals are initiated for the centres of towns within the Region.

Table 10.2 Total New Shop Area (sq. ft.) Required in Town Groups by 1985
(see Notes)

Town Group	1985 Popula- tion	% of 1985 Popula- tion	1985 Total Shopping Area sq. ft. Note 1.	1963 Total Shopping Area sq. ft. Note 2.	Existing Shops to Equivalent 1985 Area sq. ft. Note 3..	Assumed 50% Ex- isting Retained by 1985 sq. ft. Note 4.	Total New Shop Area Required by 1985 sq. ft.
Kirkliston/ Newbridge	3,500	2.5	12,500	6,000	3,000	1,500	11,000
Winchburgh	5,000	4.0	20,000	4,500	2,000	1,000	19,000
Broxburn/ Uphall	20,000	15.5	77,500	30,000	15,000	7,500	70,000
Ecclesmachan	2,000	1.5	7,500	nil	nil	nil	7,500
Bathgate	22,500	17.5	87,500	200,000	100,000	50,000	37,500
Armadaile	10,000	7.5	37,500	28,000	14,000	7,000	30,000
Whitburn	10,000	7.5	37,500	36,000	18,000	9,000	28,500
Fauldhouse	6,000	4.5	22,500	18,000	9,000	4,500	18,000
Blackburn	15,000	11.5	57,500	7,000	3,000	1,500	56,000
Addiewell	8,000	6.5	32,500	11,500	6,000	3,000	29,500
Polbeth/ West Calder	13,000	10.0	50,000	28,000	14,000	7,000	43,000
Mid and East Calder	15,000	11.5	57,500	9,000	5,000	2,500	55,000
Totals	130,000	100.0	500,000	378,000	189,000	94,500	405,500

Notes on Table 10.2

- Note 1 The total shopping area required by 1985 has been abstracted directly from Table 11.8, Chapter 11, Volume I. This sales-area, therefore, is the product of each town's 1985 population multiplied by the factors given in Table 11.8 for convenience goods shopping only.
- Note 2 The 1963 existing shopping areas have been derived from the survey results of J. Conner (see Appendix E, Table 10.3). These results, which are expressed in terms of retail floor space, have been modified to convert them to total shop area by allowing for 60% additional storage space.
- Note 3 See Chapter 11, Volume I, where it is suggested that existing areas should be reduced by 50% to equate existing floor space to a 1985 equivalent.
- Note 4 The reduction factor of 50% allows for existing shops being retained in 1985, and others being demolished or otherwise replaced to make way for new development. This factor would naturally vary from town to town but in this study a 50:50 average figure has been adopted for overall calculations.



EXISTING SHOPPING FACILITIES

(SHOWING SHOPPING POPULATION
GAINED OR LOST BY THE
VARIOUS TOWNS)

Parking Space in Central Areas

Traffic generated in central areas can be divided conveniently into five main types: shoppers visiting the central area; workers employed in the central area; salesmen, etc., making essential trips to the central area on business; service vans making deliveries to and from the central area; and residents within the central area. To estimate standards of car parking for these types of central area users, it has been assumed that Saturday is the 'peak load' day. The amount and relationship of the types of parking space users varies according to the size, location, accessibility and functions which the various central areas and their towns fulfil. Thus Professor Buchanan (19) in his study of the central area of Leeds determined that the peak hour parking demand would be about 24,000 spaces divided as follows:

Shoppers	6,600	27%
Workers	11,500	47%
Essential	2,000	7%
Vans	4,000	19%
Total	24,000	100%

This study made no allowance for residents' car parking.

In small towns such as those within the Survey Area it is probable that the proportional distribution of these estimates would vary considerably. A major variation would occur in type 2, 'workers employed in the central area' since only those persons employed in the distributive and service trades would require parking facilities in the small town centres; other types of industrial and commercial employment would be provided elsewhere.

The mode of transport used by shoppers to various types of centres has also been estimated by Professor Buchanan (20) and he assumes that 64% of shopping trips to the town centre would be made by car (occupancy rate of 1.3 and car park turnover of 5 per day). Similar studies have been carried out within the Survey Area (17) and the following estimates have been derived on the assumption of a one car per family ownership level by 1985.

Table 10.3 Estimated Mode of Transport for Shopping Trips within the Lothians Region in 1985.

Destination of Shopping Trip	Car	Public Transport	Other Means	Walk	Total
To Local Centre	14%	10%	-	76%	100%
To Regional or Ex-regional Centre	65%	34%	1%	-	100%

Professor Buchanan estimated that in Leeds by 2010 A.D. 71% of all shopping trips would be by car, 22% by public transport, and 7% on foot. These estimates vary a great deal from those given in Table 10.3 for local shopping trips made in the Lothians Region, which no doubt reflect the smallness and compact nature of the Region's towns. In the Lothians Study (17) it was found that as the size of the town increased, more use was made of motorised transport. The estimates shown in Table 10.3 for local shopping trips could therefore be accepted as applying to towns with a maximum population of between 10,000 and 15,000 persons, although these figures would vary according to the distribution of local shops within the towns.

From these considerations and information derived from the 'Shopping in Coventry' Report (21) it is proposed that the following standards be adopted for the provision of car parking in central areas:

- 1 Car parking space for shoppers should first be calculated at one thousand square feet of parking area for every thousand square feet of shopping sales area, then:
- 2 for towns with less than 10,000 population, a further 10% should be added for other purposes;
- 3 for towns with a population of between 10,000 and 15,000 a further 25% should be added for other purposes, and;
- 4 for towns with a population of between 15,000 and 25,000, an additional 50% should be added for other purposes.

By adopting these standards it has been possible to estimate the total number of car parking spaces required in the various Town Groups within the Region by 1985, and these are given in Table 10.4.

Table 10.4 Proposed Area of Car Parking (sq.ft.) Required in Town Groups by 1985

Town Group	1985 Shopping Area sq.ft. (Table 10.2)	Basic No of Car Parks (300 sq. ft. per car)	Percentage to be added	Total 1985 No. of Car Parks	Total Car Park Area (sq.ft.).
Kirkliston/ Newbridge	12,500	40	10%	45	13,500
Winchburgh	20,000	70	10%	80	24,000
Broxburn/ Uphall	77,500	260	50%	400	120,000
Ecclesmachan	7,500	25	10%	30	9,000
Bathgate	87,500	290	50%	445	135,500
Armadaile	37,500	125	25%	160	48,000
Whitburn	37,500	125	25%	160	48,000
Fauldhouse	22,500	70	10%	80	24,000
Blackburn	57,500	190	25%	240	72,000
Addiewell	32,500	100	10%	110	33,000
Polbeth/W. Calder	50,000	170	25%	210	63,000
Mid and East Calder	57,500	190	25%	240	72,000
Totals	500,000	1,655	-	2,200	662,000

Other Central Area Land Uses: Space Allocation

The calculations for shopping areas in Volume I of this Report (22) did not allow for central area facilities such as banks, post offices, public houses, service stations, or social, recreational and civic buildings normally found in central areas. To make allowances for these additional facilities estimated areas required per head of population have been derived from various surveys. There is however considerable scope for variance from a 'standard', so that in its application two other factors have been taken into consideration.

First, the 'standard' needs to be modified according to the character and size of the centre, and, second, in some towns many facilities are distributed throughout the town rather than grouped together in one central area. Thus, while Bathgate's Central Area Redevelopment proposals will maintain a large central area, allowance has been made for a more generous distribution of shopping facilities in the outlying residential areas than exists at present. In Broxburn/Uphall, where large-scale development is proposed, four shopping centres will be required by 1985, with a further centre being needed in the subsequent phase of expansion. The standards are derived from a survey of New Town shopping centres carried out by J. Conner (17), and are given in Table 10.5.

Table 10.5 Standard Central Area Land Use Requirements per head of population served

Type of Centre	Total Area of centre	Comments
Neighbourhood centre	25 sq.ft./person served	} Shopping area is normally equal to approximately one fifth of total central area
New Town centre	40 sq.ft./person served	

Appendix E, Table 10.4, sets out the proposed total central area land usage based on these standards for each of the Survey Area's towns for 1985.

Proposals for the Principal Settlements in the Town Groups

Kirkliston. No advisory plans have been prepared for the smaller towns like Kirkliston. The town straddles the A9, with shops on both frontages. It is proposed that future development be restricted to the south of the A9, and that urban uses to the north of this road be phased out. The town needs only one centre as all residents will be within easy walking distance of it.

Winchburgh. All development should be restricted to the south of the A9, where one centre of about 2.5 acres is proposed. Three local shops should be sited in the residential areas to provide convenient necessity shopping.

Broxburn/Uphall. Four shopping centres are proposed along the old through-town road to cater for the population of twenty thousand. Although this 1985 population will be almost as great as that of Bathgate, it is considered that in Broxburn/Uphall more than one centre should be developed, and that residents of the town should not be discouraged from journeying to Livingston New Town for major shopping. If only one centre were allowed to develop at this stage, it could discourage growth in Livingston New Town's centre. Two centres are therefore proposed, based on Broxburn, and two lesser ones based on Uphall. A further centre may be sited near the geographical centre of the expanded town when development takes place north of the present town in the post-1985 period. This centre could be encouraged to expand to become the most important one, thereby providing an essential focus to the fully developed town. Major civic, educational, recreational and cultural facilities could also be sited in this centre. The retail floor space distribution figures for 1985 make allowance for some local shops in the residential areas.

Ecclesmachan. It is proposed that this area be developed for middle-income housing with a population of two thousand. Because of its proximity to Broxburn/Uphall, Livingston and Edinburgh, it is

proposed that there should be a small centre with a general store and a service station.

Bathgate. Now the shopping centre for the Region, this town will inevitably lose some of its trade to the Livingston New Town centre. Also, as other nearby towns develop new centres many of the regional facilities now provided by Bathgate will tend to be attracted to the New Town where extensive and more attractive facilities will be available. Bathgate's town centre and many of the local shops require redevelopment, and the central area is already being replanned by the Local Authority's design consultant. Proposals for this town, therefore, include a more generous distribution of local shops throughout the residential areas, and a reduction in the total retail floor space within the town centre. Bathgate will continue to attract trade from the nearby towns of Armadale, Whitburn and Blackburn, and by allowing for trade generated by the increase in its population, it would be reasonable to assume that no overall loss in turnover need result from these proposals, although trade is expected to be concentrated on convenience goods.

Armadale. The redevelopment of the town's centre is a major feature of the proposals shown in the Advisory Plan which include the distribution of some six local shops throughout the residential areas.

Whitburn. Similar to Armadale, this town will benefit from the road diversionary scheme proposed in the Advisory Plan. Since the target population for the town is ten thousand, only one major shopping centre is proposed, with provision for the distribution of some eight local shops within the four residential areas.

Fauldhouse. A rationalisation of the town road system would much improve the town centre. It is proposed that one dominant central area be developed with provision for the distribution of three local shops within the residential areas.

Blackburn. Proposals by private developers are well advanced for the town's new centre and it is proposed to reroute through traffic on the B792 to allow safe pedestrian access to the new centre. Proposals also allow for six local shops to be distributed within the residential areas.

Addiewell. The Advisory Plan for this Town Group aims at uniting the separate communities of Addiewell and Stoneburn. The proposed centre is conveniently placed to the residential areas and, with new schools sited in the valley of the Breich Water, should help to foster social cohesion. Two local shops need to be sited in the outlying residential areas.

West Calder/Polbeth. Rezoning will permit the development of a traffic-free centre in West Calder and it is proposed that this should become the major centre for this Town Group. The existing sub-shopping centre in Polbeth should be extended to provide for the increased local population. Thus this Town Group should encourage two large centres with the larger at West Calder and in addition six local shops should be distributed within the residential areas.

Midcalder and East Calder. Due to the existence of shopping centres in both towns, and the impossibility of establishing one centre within easy walking distance of all residents, it is proposed to develop the two shopping centres, one in each town. That at Midcalder however is planned to dominate, as this centre offers greater potential in convenience of access to the first phase housing in the New Town. The proposals include the distribution of six local shops within the residential areas.

Summary of Proposals

The superimposition of a large scale shopping centre at Livingston designed according to contemporary planning principles will have a considerable effect on the existing shopping facilities and future shopping habits of the Survey Area residents. This factor, coupled with the proposed expansion of the majority of Town Groups, will call for redevelopment of most, if not all, existing centres. At present, redevelopment proposals for four centres, Bathgate, Whitburn, Blackburn and Broxburn, are in hand. It is therefore proposed that each Town Group centre be made the subject of a redevelopment scheme which in principle accepts the basic concepts set out in Chapter 11 of Volume I for the whole Region's shopping facilities.

Design of these shopping centres should allow for separation of pedestrians and vehicles in so far as their relative size reasonably demands this.

In addition to the recommendations made in this Report concerning the actual amount of retail floor space required by each Town Group, sufficient land should be provided for customer car parking to ensure the success of the centre.

Access to shopping centres by public transport should be facilitated to discourage demands for customer parking spaces.

To make the provision of parking, public transport and shopping facilities more economic, and to add to the social attractiveness of the town centres, it is proposed that local Chambers of Commerce give consideration to such factors as the extension of shop trading hours, and in conjunction with social, commercial and industrial organisations, consider the possibility of staggering both working hours and pay days.

Overall calculations of shopping provision as shown in Chapter 11 of Volume I, and the standards related to other associated facilities prescribed in this Section, are based on target populations for 1985. It is essential, therefore, that the estimates and the standards proposed should be kept under constant review.

While the proposals for central area land uses for each of the Region's Town Groups make allowance for what at this time would seem to be the requisite number and type of facilities which should be provided, no proposals have been made concerning civic or architectural design of these centres. The data given, however, is sufficient to indicate the general scope and size of each centre and it is recommended that, in considering the further development of these centres, the Counties concerned should be guided by the recommendations of the Ministry of Housing and Local Government as set out in their Planning Bulletins (23).

SECTION 4 : OTHER COMMUNITY FACILITIES

SURVEY AND PROPOSALS

Churches

In a postal questionnaire survey (17) sent to 2,000 regional residents, questions were asked concerning frequency of attendance, location of church visited and means of transport used. The results of this aspect of the survey indicated that church going was an almost entirely locally orientated social activity and quite a high percentage of respondents indicated that they attended church services at least once a month.

In making provision for new churches to meet the needs of the increase in regional population, it is recommended that sites of one acre be reserved for every 5,000 additional population.

Licensed Premises

Details of all existing licensed premises were gathered in the survey of the Region's shopping facilities and allocation of land has been included for this use in the general space standard of 25 sq.ft. per person for central areas (see Section 3 of this Chapter).

Libraries

Both Counties have existing programmes for the provision of branch libraries, and it is recommended that these be extended to provide a central library within the Livingston New Town centre, and that all other Town Groups (with the exception of Ecclesmachan, Winchburgh and Kirkliston) be provided with branch libraries by 1985. A mobile library service is at present in operation and should be expanded in the short term to cope with initial population increases. Space for these facilities has been included in the general central area space standard, set out in Section 3 of this Chapter.

Other Social and Recreational Facilities

Although no comprehensive survey was undertaken within the Survey Area by the physical planners, reference to the local press indicated extensive social and recreational activities occurring within the Area. Social and recreation facilities, such as dance halls, ten-pin bowling alleys, etc., are normally associated with central areas and allowance has been made for them in the central area space standards set out in Section 3 of this Chapter. The Recommendations of the Recreational Planning Advisory Committee concerning the provision of a Community Centre for arts, crafts and social facilities is also emphasised (see Chapter 13).

These facilities are normally provided at a late stage in the development of a new town and are not generally financed by Local Authorities. As for other proposals in this Report, it is strongly recommended that the provision of facilities for community activities should be given urgent attention by Local Authorities and should be borne in mind when town centre redevelopment proposals are being considered. It may then be possible either to provide a Community Centre out of the profits of redevelopment or to encourage private enterprise to combine with the Local Authority in a joint venture of this character.

Burial Grounds

Adequate facilities for this provision already exist within the Survey Area for present needs. For the future population of the Region, however, two new burial grounds will be required, and their location is discussed in Chapter 13.

SUMMARY

Survey

Section 1 : Education Facilities

The County Councils are obliged to provide adequate primary, secondary and further educational facilities for their respective populations. This service accounts for 30% of the Councils' finance.

The existing education facilities are shown on Map 10.1 and further details are given in Table 10.1, Appendix E. These include thirty six primary schools with approximately seven thousand five hundred pupils, thirteen secondary schools with approximately five thousand pupils, and one technical college. New secondary schools are being completed at Bathgate and West Calder, one secondary school is under construction at Armadale, and two are planned at Whitburn and Blackburn.

A Technical College is nearing completion at Bathgate for one hundred and fifty full time students, and eight hundred and sixty part time students, and will offer courses including technical trades and commercial subjects.

For university needs the Survey Area has Edinburgh University only six miles to the east, and a second University is being created in Edinburgh with the change of status of the Heriot Watt College. In Glasgow, twenty miles to the west, there are two Universities, and recently a new University was agreed for Stirling, eighteen miles to the north-west.

Adult and further education facilities are normally catered for within existing secondary schools.

School provision in the Area is adequate at present, although several of the school buildings are out of date and require replacement. Prior to the designation of Livingston New Town, both County Authorities had plans for major re-organisation of their school facilities.

Section 2 : Health Facilities

There are three hospitals at present in the Survey Area, each under the control of West Lothian (Bangour) Hospital Management Committee. Bangour Hospital (1732 beds) is one of the largest hospitals in south-east Scotland, and provides a full range of hospital services for general, specialist and mental patients. A twenty-five acre site has been reserved in Livingston New Town for the replacement of the general hospital, providing space at Bangour for the expansion of the existing geriatric and mental hospital facilities. Tippethill Hospital (76 beds) treats general and chronically ill patients.

Other Health Services include : Limefield House, an old people's home; Linburn Home for the War Blinded; seventeen Maternity and Child Welfare Centres; School Health Service; Ambulance Service Home Nursing Sisters, etc.

The ratio of doctors in the Area is 1:2,100 which is adequate. The ratio of dentists at 1:5,900 is above the Scottish optimum figure of 1:4,500. The ratio of chemists is 1:3,180 and this provision is considered adequate.

Section 3 : Shopping and Central Area Provision

Because of Bathgate's central location, its early development of secondary industries, and the establishment of train and bus services

serving both town and Region, it has become the regional centre within the Survey Area. Bathgate's own population accounted for only 38% of the total regional population in 1963; but Bathgate had 45% of the Region's total shopping floor area, and captured about 25% of gross regional retail trade.

The seven small town centres of the Region housed about 57% of the total regional population in 1963, and had only 36% of total shopping sales floor area. Village centres housed about 25% of the total regional population in 1963 (including the farming communities in the landward areas) and provided only about 11% of the total regional shopping sales floor area. Both small town and village centres therefore capture about 47% of gross regional trade while they have 82% of the total regional population. In 1961 the Region lost about 28% of its total retail trade to centres outside the Area. As about 48% of consumer's retail expenditure is spent on food, the position of these service centres is clearly that of providing essential goods only. Bathgate as a regional centre captures some of the Region's durable goods trade but is not sufficiently large to offer serious competition to Glasgow and Edinburgh. Table 10.3, Appendix E, shows the results of an analysis of the distribution of shopping floor space between the various towns of the Survey Area, and between each trade group.

In most centres, existing development has followed a linear form, with town centre facilities expanding along the town's main road. Bathgate, Whitburn and Blackburn already have town centre redevelopment schemes.

Proposals

Section 1 : Education Facilities

The overall school and educational building programme required, both in the New Town itself, and the surrounding Survey Area, is extensive. With regard to the individual Town Groups of the Survey Area, it is recommended that nominated school sites be acquired by the Local Authorities as early as is practicable. Only by this means will it be possible to establish the correct physical relationship between schools and residential areas.

Section 2 : Health Facilities

The major considerations here, in land use terms, are the proposed new General Hospital at Livingston and, on the basis of present population proposals and existing standards, the need for a further general hospital of about five hundred beds. As this matter is largely contingent upon the future of the existing Bangour Hospitals and the Hospital Board's views of rezoning areas to be served by these Hospitals, proposals at this point can be no more specific.

Section 3 : Shopping and Central Area Provision

Immediate improvements could be made to most central areas by road diversionary schemes and pedestrian-vehicular segregation. These are short term proposals, however, and, in line with the overall regional policy of development and rehabilitation, it is recommended that each of the principal centres in the Town Groups be extensively redeveloped. Detailed standards are stated in Section 3 of this Chapter.

Section 4 : Other Community Facilities

Where these facilities are normally associated with central areas, space will have been included already in the overall central area land use proposals (see Section 3 of this Chapter), but where this is not

the case suitable standards have been recommended for the reservation of land. Special attention is drawn to the provision of social and recreational buildings, as it is felt that early expansion and establishment of these facilities would do much to create a strong community spirit, not only in the townships concerned, but throughout the whole Survey Area and the New Town.

REFERENCES

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4. op. cit. See Chapter 14.
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Chapter 11. UTILITY SERVICES

INTRODUCTION

Utility Services have been studied in four parts and are presented in the following order: 1 ELECTRICITY SUPPLY, 2 GAS SUPPLY, 3 WATER SUPPLY, 4 SEWERAGE AND SEWAGE DISPOSAL. Methods of treatment and disposal of wastes are presented in APPENDIX F. A Summary of the Survey and Proposals for each service is given at the end of the Chapter.

1 ELECTRICITY SUPPLY

Introduction

The supply of electricity in Scotland is the responsibility of two Boards: the North of Scotland Hydro-Electric Board serves the area lying north and west of a line from the southern end of Loch Lomond to the Firth of Tay; the South of Scotland Electricity Board serves the rest of Scotland. The North Board's area extends to approximately twenty-two thousand square miles, with a population of just over 1,000,000. The South Board's area extends to approximately eight thousand square miles, and includes Central Scotland and the Lothians Region, with a population of more than 4,000,000. Each Board is autonomous and is responsible for the generation and supply of electricity in its own area; both Boards are under the general control of the Secretary of State.

On 21st March, 1961, C. H. Mackenzie was appointed by the Secretary of State for Scotland to "review the arrangements for generating and distributing electricity in Scotland, having regard to: (i) the availability and cost of hydro-electric power and of other sources of electricity, (ii) the rate of increase in the demand for electricity, and (iii) the needs of the remoter areas; and to make recommendations". The Report was submitted on 7th September, 1962.

The principal findings of the Mackenzie Report were:

- a By 1975, maximum demand in Scotland is likely to have risen to about seven thousand seven hundred MW from about three thousand MW in 1961 (Table One, page sixteen).
- b Potential supplies of coal in Scotland are sufficient to sustain a new large coal-fired station of two thousand/two thousand five hundred MW (para. 57).
- c Apart from hydro-electric projects already authorised, under present conditions, water might be expected to contribute four hundred MW of Scotland's additional electricity requirements (para. 65).
- d Further generating capacity of about five thousand MW will need to be authorised between now and 1975 (para. 142).

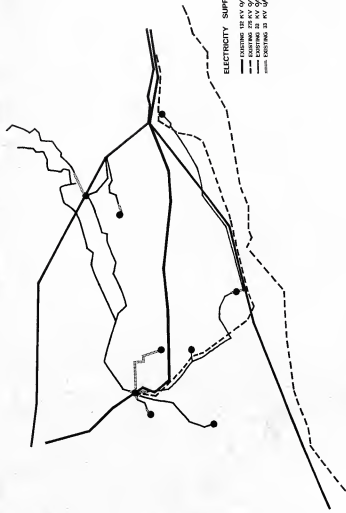
The demand for electricity is expected to rise. The Mackenzie Committee asked the North and South Boards to estimate the level of this demand in Scotland over the next ten to fifteen years, and to give a year by year estimate up to 1970.

The total unit sales in the South Board over the last six years increased by sixty-six per cent. The trend is expected to continue, anticipating an increase in unit sales by 1970 of one hundred and three per cent over 1961.

The generating plant output in Scotland at the end of 1961 totalled two thousand, eight hundred and fifty-eight MW. Additional output capacity of two thousand, six hundred and seventy-two MW has been authorised which, when account is taken of the two hundred and forty-nine MW plant due to be retired, will bring the aggregate of output capacity up to five thousand two hundred and eighty-one MW at the end of 1968.

With the addition of supplies from Hunterston Nuclear Power Station in Ayrshire, Scotland, in relation to the size of her population, will be consuming more nuclear electricity than any other country in the world. Because of slow progress in the building of Hunterston, the second half of the Kincardine Power Station (four hundred MW) was brought forward to provide an adequate supply by 1963.

At the time of completion of the Mackenzie Report construction had begun on the one thousand, two hundred MW coal-fired station at Cockenzie, East Lothian, which will be fully operative by 1968. Construction had also begun on a slurry burning station at Methil, Fife (sixty MW). This is due to open in 1965/66.



ELECTRICITY SUPPLY

- EXISTING 132 KV Q/H LINES
- - - EXISTING 275 KV Q/H LINES
- - - EXISTING 33 KV Q/H LINES
- EXISTING 33 KV U/G CABLES

According to the estimates, in order to meet the demand of 1975, further generating plant with an output capacity of about three thousand MW would be needed. By 1980 a further two thousand MW together with replacement capacity for the plant to be retired between 1975 and 1980, would be required. Potential supplies of coal in Scotland would be sufficient to sustain a new coal-fired station of two thousand/two thousand five hundred MW.

In August 1963 the S.S.E.B. announced the location of a new 2400 MW coal-fired generating station at Longannet, Fife. The Longannet Generating Station is expected to start producing electricity in 1969.

Electricity Service and the Lothians Region

The Lothians Region forms part of the Bathgate District of the Stirling Area of the South of Scotland Electricity Board. The northern part of West Lothian, i.e. Bo'ness and Linlithgow, is served by thirty-three thousand volt and eleven thousand volt systems which are fed from the Grangemouth grid sub-station. Large or small supplies are available to any industrial site in these localities at eleven thousand volts or four hundred and fifteen volts according to the needs of the consumer.

The County of West Lothian has a grid sub-station located between Armadale and Bathgate, and a new grid sub-station will be established in 1966 south of Broxburn. The coal and fireclay industries at Bathgate, Armadale, Whitburn, Fauldhouse and Blackburn are served by the Bathgate grid sub-station. Here supplies are taken direct from the grid and offered at 11,000 volts or 415 volts and there are adequate power resources. New industries in the north-east of Livingston and in Newbridge will be served by the Broxburn grid sub-station. Very large consumers can be served by the 33,000 volts systems which radiate from the two grid sub-stations and step down to 11,000 volts wherever required. The Bathgate grid sub-station also provides 33,000 volts supplies to Midlothian.

The 275 KV Super Grid (see Map 11.1). If a sub-station were required, it would cost £750,000.

The 132 KV Grid (see Map 11.1). One or two sub-stations would be required (each about one and a half or two acres) near the load centre. Cost would be approximately £250,000 each, with line costs at about £12,000 per mile.

The 33 KV system will require five to six sub-stations each being about one hundred feet square and costing £70,000 excluding the expense of distribution cabling. They should therefore be located within the consumer area.

The remainder of the Distribution System supplies domestic users at a charge of approximately £65 per house, rising to £80 per house in the case of all-electric centrally-heated houses. This allows for one hundred and fifty to two hundred 11 KV sub-stations, which may be located within buildings, as in the case of multi-storey flats.

In 1961, the domestic consumer accounted for thirty-seven per cent of sales in the South of Scotland Electricity Board's area. The number of domestic consumers has increased at an average rate of 21,610 a year. The most important single factor in increasing prospective consumption is in the building of all-electric houses. In the South Board's area, it is estimated that fifty per cent of all Local Authority houses under construction will be entirely dependent upon electricity. The Board estimates that occupiers of all-electric houses consume ten thousand to twelve thousand units per annum, which is about five times the present average individual domestic consumption. Industrial consumers account for forty-two per cent. The rate of growth of consumption over the period 1955 to 1961 was thirty-two per cent.

The disposition of the grid system at present, relative to the Region, can supply sufficient power to cater for an increase in population of two hundred thousand.

Negotiations are proceeding to place underground all cables in the Livingston New Town area, but so far agreement has been reached in respect only of circuits up to, and including 11,000 volts. This agreement does not extend to the Survey Area where the Board will not yield their rights to erect overhead circuits wherever they choose, subject to planning permission and wayleaves.

General Principles

Electricity cannot be stored in any worthwhile quantity. It has, therefore, to be produced and supplied as and when it is needed by the users. Users' requirements vary throughout the day, the week, the month and the year. Collectively, requirements reach a maximum for fairly short periods during the morning and afternoon of winter weekdays. At other times in winter days, and during winter nights and weekends, the demand is smaller. At other seasons, while following the same daily and weekly pattern, demand tapers off until it reaches its lowest point about July.

An authority supplying electricity in accordance with the statutory regulations must be prepared to satisfy the demand, whatever it may be, at any time throughout the year. Sufficient generating transmission and distribution plant capacity must be available therefore to meet the winter peak demand and provide a margin for breakdown.

Quantitatively, therefore, the main operational problems of the electricity supplier are to provide generating plant to meet the winter peak demand (with the appropriate margin), and year by year to obtain enough fuel to produce the amount of electricity required by users. The supplier must also provide a transmission and distribution system for users.

Proposals

Two factors which affect plans for the supply of electricity in the Region are:

- a the policy of Livingston Development Corporation and of the County Councils of Midlothian and West Lothian with regard to the electric heating of houses;
- b the location and type of industry throughout the Region.

The South of Scotland Electricity Board should, therefore, be informed of any policy decisions on these matters at an early stage.

The anticipated increase in demand for electricity in the Region suggests a corresponding increase in overhead cables distributing the supply. Whether additional cables are routed overhead or underground is primarily a matter of economics. An overhead two hundred and seventy-five KV double circuit can cost £27,000 per mile, compared with £400,000 per mile for underground routing. Nevertheless, consideration should always be given to laying cables underground wherever the amenities of an urban area are affected.

The total unit sales in S. S. E. B.'s area increased by sixty-six per cent over the last six years; this increase is expected to reach one hundred and seven per cent by 1970. These are staggering figures, which will intensify the problem of overhead cables. Careful consideration of the design and location of transmission lines is essential.

In general, the line of the Super Grid has been routed through rural areas but, in order to link generation points to consumer areas, shorter areas have to be traversed. In many cases this has necessitated the penetration of the towers into urban areas with considerable damage to amenity. It is therefore proposed that the following basic rules evolved by Sir William Holford should be kept in mind when new transmission routes are planned:-

- a Avoid altogether, if possible, the major areas of highest amenity value by so planning the general route of a line in the first place, even if the total mileage is somewhat increased in consequence.
- b Avoid smaller areas of high amenity value or scientific interest by deviation, providing this can be done without using too many angle towers, i.e. the more massive structures which are used when lines change direction.
- c Other things being equal, choose the most direct line with no sharp changes of direction and thus with fewer angle towers.
- d Choose tree and hill backgrounds in preference to sky backgrounds wherever possible; and when the line has to cross a ridge secure this opaque background as long as possible; and cross obliquely when a dip in the ridge provides opportunity. Where it does not cross directly, route preferably between belts of trees.
- e Prefer moderately open valleys with woods, where the apparent height of towers will be reduced and views of the line will be broken by trees.
- f In country which is flat and sparsely planted, keep the high-voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires and cables, so as to avoid a concatenation of 'wirescape'.
- g Approach urban areas through industrial zones, where they exist; and when pleasant residential and recreational land intervenes between the approach line and the sub-station, go carefully into the comparative costs of undergrounding, for lines other than those of the highest voltage.

There are substantial technical difficulties involved in planning a transmission route in the most economical and efficient manner. Nevertheless, there is scope for good planning and for careful consideration of alternative alignments so that the countryside is disturbed as little as possible. There is no doubt that any overhead line in an open stretch of country, and particularly in an urban area, injures the landscape and the amenity, and wherever practicable these cables should be located underground.

2 GAS SUPPLY

Introduction

Prior to the nationalisation of the gas industry in May 1949, gas supplies were obtained from individual sources of manufacture, whose owners were responsible for supply and distribution in their respective areas. The quality and efficiency of distribution varied within wide limits.

Since nationalisation, the Scottish Gas Board have pursued a policy of providing a supply of gas of standard quality and pressure in all these areas, while concentrating production on large efficient undertakings and supplying fuel by an integrated National Gas Grid.

Existing Facilities in the Region

Gas supplies for the Lothians Region are administered by the Edinburgh and South East Group of the Scottish Gas Board (see Map 11.2). An integrated grid distribution system which will cover four thousand square



miles of central Scotland is expected to be completed by 1965. The grid line from Dundee to Ayr was completed in 1963, being supplied by the production plants at Westfield and Provan. A spur to the production plant at Granton, Edinburgh, is taken from the Dundee-Ayr grid line at Shieldhill, by Falkirk, which supplies gas to the eastern area of central Scotland. This spur passes east/west along the northern boundary of the Lothians Region. All gas producing plants in the Region are now closed down, but the units at West Calder, Broxburn, Bathgate, Fauldhouse and Armadale are used for storage or 'reducer governors'.

The western part of the Region (Bathgate, Armadale, Whitburn, Blackburn, Blackridge, Harthill, Livingston Station, Seafeld, East Whitburn, Fauldhouse, Longridge, Stoneymorn and West Calder) is linked by the old distribution grid and is heavily overloaded. The gas is supplied from the Super Grid by a spur to Armadale which is the governor station.

The eastern part of the Region (Winchburgh, Kirkliston, Broxburn, Uphall and Dechmont) is supplied direct from Granton, Edinburgh. This is also overloaded.

The following villages have no gas supply: Bridgend, Philpstoun/Pardovan, Ecclesmachan, Threemiletown, Uphall Station, Pumpherston, Midcalder, East Calder and Polbeth.

The Scottish Gas Board are at present designing a direct link from the Super Grid to supply the British Motor Corporation and the residential expansion at Bathgate, but the Board has no plans to enlarge the existing distribution grid or to extend it to the villages at present without a gas supply.

Proposals

A complete review of the gas supply system for the Region should be undertaken at the earliest stage so that programming of supply can be related to urban and industrial development.

3 WATER SUPPLY

Introduction

Industrial development taking place in Scotland requires considerable expansion of water supply.

A Working Party, set up in 1960 to assess the future demand for water in the Central Industrial Belt of Scotland and to examine possible sources of supply, has advised the Secretary of State for Scotland that the Loch Lomond Scheme is sound and economical.

The Consulting Engineers (Messrs. Crouch & Hogg, 18 Woodside Crescent, Glasgow C.3) reported favourably on the technical aspects of the proposed scheme to tap Loch Lomond and the Secretary of State accepted their recommendation. The Interim Joint Committee of local authorities concerned in the scheme has prepared a draft Water Order, and preliminary work has started with a view to implementation of the scheme.

There is a water scheme in hand at West Water, Peeblesshire, to supplement the supply to the Almond Valley and Livingston New Town, in advance of the Loch Lomond supply.

Existing Water Supply in the Lothians Region

For water supply distribution purposes the Lothians Region can be regarded as being divided into three areas: western half of West Lothian; eastern half of West Lothian; the Calder district of Midlothian.

The principal sources of water supply are at Baddingsgill, Peeblesshire, Forestburn, Lanarkshire, Morton, Midlothian, and Bee Craigs and Lochcote, West Lothian.

WATER SUPPLY

- EXISTING DISTRIBUTION
- - - NEWER CONSTRUCTION
- LOCH LOMOND SUPPLY
- EXISTING STORAGE
- PROPOSED STORAGE



The Lothians Region is served by two Water Authorities (see Map 11.3): Edinburgh Corporation, responsible for Midlothian County; and West Lothian Water Board, responsible for West Lothian County, and for Livingston New Town.

The existing integrated system of reservoirs, water storage tanks and water mains under the operation of West Lothian Water Board has been designed to enable supplies to be taken from any of the four major reservoirs to any part of the County according to the demand and is capable of relieving any emergency situation.

With the increase in demand for water, the need for an additional source of supply and a more efficient system of distribution became necessary and the Water Board was initiated to organise this. The first major task of the Board was to implement the technical proposals formulated by West Lothian County Council, prior to the formation of the West Lothian Water Board. This included the construction of a new impounding reservoir near the existing Baddingsgill Reservoir in Peeblesshire and the improvement of the network of watermains and water storage tanks in the County.

Site works started on the new West Water Reservoir in September, 1962. The complete scheme will cost £3m, and is expected to be operating by 1967. To augment existing supplies as soon as possible, the Board constructed a burn intake to the Baddingsgill Reservoir during Phase One, which will provide an additional 600,000 gallons per day. This new supply of water will be brought to the filters at Pateshill and from there into the County distribution system.

The existing water supplies and those proposed from other sources to serve the needs of the Region should be fully utilised by 1967 by the increase in industry and population. From 1967, additional demand must be met by the projected Loch Lomond Scheme.

Schemes in Process of Implementation

West Lothian Water Board has calculated domestic water requirements on the basis of fifty gallons per head per day: ten gallons per head per day higher than the average consumption in industrial areas of Scotland. The needs of industry have been calculated at forty gallons per head per day of population, this being a standard method of establishing the probable combined needs of residents and industry. By 1985, the total requirements of the Region, with a population of 230,000, would amount to approximately twenty million gallons per day (20 m.g.d.)

The additional water required in the Region will be supplied from two main sources: the first principal source is the Water Board's present undertakings at Baddingsgill and West Water; the second is the projected Loch Lomond Scheme. Water from the two parts of the first source will mix at the Pateshill Filter Station, and the maximum output of this filter station will 6 m.g.d. Of this quantity, even after the completion of the first phase of the Loch Lomond Development, 1 m.g.d. will still be required to serve Fauldhouse and higher levels of Armadale, Bathgate and Bangour. Of the remaining 5 m.g.d. some will almost certainly be required in the West Calder area and it has been assumed that only 4.7 m.g.d. will be supplied to Livingston New Town. It is proposed that water from Pateshill be fed into two service reservoirs, one of 2 m.g. capacity at Dechmont Law, and a second of 1 m.g. capacity near Balgreen, and that this water will supply the high level parts of the New Town. Two additional tanks will supply the lower levels of the New Town.

The overall total demand for the New Town is estimated at approximately 11 m.g.d. of which 5.5 m.g.d. will be required from the Loch Lomond Scheme. The Loch Lomond Scheme is the result of a study started in

1961 at the request of the Secretary of State for Scotland. Representatives from the Scottish Development Department and the water authorities of Dunbarton County Council, Kirkintilloch Town Council, Lanark County Council, Stirling County Council, Stirlingshire and Falkirk Water Board and West Lothian Water Board formed a Working Party to investigate possible schemes which would meet the rapidly growing domestic and industrial demands for water in Central Scotland. The Secretary of State has approved the scheme proposed by this Working Party. Briefly, the Scheme consists of controlling the natural rise and fall of Loch Lomond and pumping the water thus made available to a central point near Torrance in Stirlingshire.

Up to 100 m.g.d. will be pumped and treated at Torrance, and will be suitable for domestic and industrial use. The Scheme allows for vast reserves to be readily available for Cumbernauld New Town and Livingston New Town and for industrial expansion.

At present, it is understood that water from the Loch Lomond Scheme to serve the Region will be piped to a large storage reservoir in the Easterlairs area, west of Armadale. From this point mains will be laid to carry the water to its final destination within the Region. If progress on the Loch Lomond Scheme is smooth and uninterrupted, it may be possible to start work on all sections of the Scheme in the Spring of 1966. Construction is likely to take two and a half years to complete.

Proposals

The Technical Officers concerned with water supply in the Region should continue to co-operate in a joint effort to ensure that water supplies be designated and provided in accordance with the planned urban and industrial development of the Region.

There is continuing pollution of the Region's rivers, caused by the leaching of iron from bing material. This is considerably higher where bings are adjacent to rivers, and it increases when the bing is disturbed by quarrying or by other mechanical movement. The oldest bings have had iron and other toxic chemicals leached from them by the action of rain, and, if undisturbed, they do not create a serious problem. In certain cases, however, bings have caught fire, and efforts to subdue the internal combustion by pumping water on to the bing have intensified the pollution problem. It is believed that pollution of the sub-strata water is continuing by underground leaching from the inundated shale mines. This is a serious situation, and it is therefore proposed that the D.S.L.R. be asked to investigate the problem of river pollution in the Region, and to make recommendations on the best method of treatment.

4 SEWERAGE AND SEWAGE DISPOSAL

Introduction

Within the Region the two main agents in the collection and treatment of waste are the County Councils of Mid and West Lothian. In Midlothian, sewerage is the concern of the County Engineers' Department, and refuse that of the County Cleansing and Transport Department. In West Lothian Landward Area, sewage and refuse disposal are managed by the Sanitary Inspector's Department. The Burghs within the County (Armadale, Bathgate, Bo'ness, Linlithgow, Queensferry and Whitburn) are responsible for sewerage and refuse disposal in their administrative areas, in addition to accepting sewage from the County landward development, adjacent to the burgh boundaries (see Map 11.4).

There are ten special Drainage Districts in the Lothians Region:

West Lothian: West Lothian County, East Whitburn and Livingston.

Midlothian: Breich, Loganlea, West Calder, Polbeth,
Bellsquarry, Pumpherston, Midcalder and
East Calder, Kirknewton.

The following small villages have drainage systems provided by the County Council as a Housing Authority or by local industry: Ecclesmachan, Philpstoun/Pardovan, Redmill.

Several sewerage systems have been reconstructed and several new sewage disposal plants have been built in the Region in the post-war period. A number of villages, however, continue to employ the system of septic tank disposal, with a possible danger to public health, and causing river pollution.

The Rivers(Prevention of Pollution (Scotland) Act, 1951) defines by order River Purification Board areas, and the establishment of River Purification Boards. There is one such Board for the Lothians Region, the Lothians River Purification Board, which is responsible for the area in which flow the rivers and tributaries of the Almond, Esk, Tyne and Water of Leith.

This Chapter does not deal with methods of treatment and disposal of wastes; this subject has been studied by Mr. J. C. Wylie, Consultant on Utility Services, whose report is attached in Appendix F. A summary of Mr. Wylie's recommendations is however included in the proposals forming part of this Chapter.

Survey of Existing Facilities in the Region

Armadale

Improvement and enlargement of the existing sewage disposal works is being carried out. There is no sewage disposal works for the Landward Area; the sewage is discharged into the Armadale burgh system for treatment at the burgh sewage disposal works.

Bathgate

New trunk and outfall sewers have been constructed at a cost of £100,000. The disposal works at Nethermuir and Couston (outside the Burgh) are to be enlarged and reconstructed.

Whitburn

A new works has been built to serve a population of 10,000 and can be enlarged to serve 20,000.

Blackburn

A works is being constructed in the vicinity of Blackburn House Farm. This works replaces the village system which has been obsolete for many years. The new works is designed for a population equivalent of 25,000 persons, including a population of 10,000 for Blackburn and discharge from the industrial areas of B. M. C. and Whitehill Farm.

Broxburn/Uphall

The existing works serving Broxburn/Uphall, Uphall Station and Dechmont is overloaded and obsolete. A temporary partial treatment system comprising settlement tanks and sludge drying beds is under construction at Haugh Farm. This system will be replaced by a new joint sewage disposal scheme, planned in the vicinity of Hallyards Castle.

East Whitburn

This village is served by a septic tank but it is possible that a sewer will be laid to the new Blackburn system.



SEWERAGE & SEWAGE DISPOSAL

- EXISTING DRAINAGE AREAS
- EXISTING SEWAGE WORKS
- EXISTING SEPTIC TANKS
- PLANNED SEWAGE WORKS
- SEWERING AREAS 1-9
- PLANNED SEWAGE WORKS
- SEWERING AREAS 10-13
- MAJOR PLANNED AREAS
- SERVED BY NEW SEWAGE WORKS A and B

Fauldhouse

A modern sewage disposal works has been provided to cater for a population of 6,000.

Seafield

A new sewage works has been constructed to cater for a population of 1,400.

Winchburgh

A new sewage works has been constructed to cater for a population of 3,300.

Ecclesmachan

A new sewage works is required to replace the existing septic tank system. Lack of adequate sewage facilities restricts the development of Ecclesmachan.

East Calder/Kirknewton

A new treatment works was constructed in 1954 and a Dano refuse disposal plant was constructed in 1961.

The villages situated along the Breich Valley including Polbeth, West Calder, Loganlea, Stoneyburn, Addiewell and Breich, have inadequate sewage facilities to meet their future requirements. There is a proposal to link most of these villages to the Livingston New Town sewage treatment works by one trunk sewer.

Planned Facilities in the Region

There are two principal areas in the Region which will require new facilities to cater for their future needs: Broxburn/Uphall area, and Livingston New Town/Breich Valley area. These areas have been investigated and schemes have been proposed which will cater for future needs as outlined by the Consultants.

Broxburn/Uphall area

Midlothian and West Lothian County Councils have agreed to construct a new sewage disposal works to serve communities in both Counties (i.e. Ratho, Ratho Station and Newbridge in Midlothian; Broxburn and Kirkliston in West Lothian), and also to serve industrial projects in this area. Construction on this joint scheme is expected to commence by January 1966, and it should be in partial operation by December 1966, and it should be in partial operation by December 1966. On completion of this joint scheme the temporary works at Haugh Farm will be retained for treatment of storm water.

Livingston New Town/Breich Valley area

A new sewage treatment works is planned near East Calder on the East Mill site (on the south bank of the River Almond between Midcalder and East Calder) and partly across the Almond to the north on the lands of Pumpherston Farm. This works will serve Livingston New Town, East Calder, Midcalder, Pumpherston, Polbeth/West Calder and possibly Loganlea, Addiewell and Breich. The works can be constructed in three equal stages for an ultimate population of 134,000 persons, with corresponding provision for industry.

The proposals are based on preliminary information from the Regional Consultants on population, and the draft proposals for residential and industrial development in the environs of Livingston New Town outlined in April 1964; Midlothian officials' general acceptance of the foregoing; West Lothian's possible needs, and Livingston Development Corporation's second report on planning proposals (the Draft Master Plan, November 1963).

This sewage treatment works will be fed by two main sewers; the main Almond Valley sewer (with branch sewers serving the New Town); and the sewer serving the Breich Valley/West Calder area. The latter would replace existing inadequate disposal arrangements in the area and would connect to the sewers of Livingston New Town and the New Town sewage treatment works. The proposed system can serve the industrial areas at Murieston, Brucefield Farm and Addiewell, and smaller developments such as that on Polbeth Farm, together with Midcalders, East Calder, Polbeth, West Calder and possibly Addiewell, Loganlea and Stoneyburn. Alternative schemes have been proposed for dealing with Addiewell, Loganlea, and Stoneyburn sewage either by an extension of the West Calder Burn branch sewer into the proposed Addiewell industrial site with pumping stations to discharge the sewage from Loganlea, Addiewell and Stoneyburn to the head of the Breich Valley sewer, or by the development of a new sewage works on the site lying between the railway viaduct and Cuthill Bridge to replace the three works already in the area.

Scheme One has several advantages: a substantial link sewer through a future industrial site will open up the area, but its cost, and the cost of enlarging the branch sewer down the valley of the West Calder Burn and along the River Almond, will be fairly high; no new sewage works will be necessary, thus preserving the amenity of the area; when the pumping stations in the Breich Valley have been established the whole area will be catered for and future industry will not be handicapped by having to pump large quantities of effluent to a sewer; the area between the Addiewell industrial site and West Calder would be suitable for development and, since sewage would be delivered to a large treatment works, the problem of sudden large demands could be much more readily met than would be possible if the sewage had to be delivered to a small sewage works.

Scheme Two also has several advantages: sewage effluent would be discharged to the Breich Water and help to maintain the river flow; the scheme does not restrict urban development and allows for possible use of the valley for recreational purposes; the works can serve the whole area and the future Addiewell industrial site and little expenditure will be required until the industry arrives; and about a hundred acres of land are available for industrial development in the Muirhall area with an industrial water supply of seven hundred and fifty thousand gallons a day. If this area were developed for industry with a high water demand, it is possible that the quantity of sewage to be treated might rise to the equivalent of a population of 13,000 or more. To provide for such an eventuality, a more spacious site for the treatment works would have to be found further downstream, probably on the promontory of land to the east of Cuthill Bridge, within the County of Midlothian.

The decision between Schemes One and Two will depend largely on the types of industry which come to the Addiewell and Muirhall industrial sites. If the industries require only a moderate provision for sewage treatment, Scheme Two would be adequate. Scheme One allows for better provision for large water usage, and strong effluent.

Scheme Two is likely to be cheaper, especially initially. No accurate estimate can be given until the Technical Officers of the Counties of Midlothian and West Lothian confer and arrange for the preparation of a comparative estimate of cost and benefit for both proposals.

There are no planning objections to either of these Schemes.

Proposals

The Agencies concerned with Sewerage and Sewage Disposal should continue to co-operate in a joint effort to ensure that facilities be designated and provided in accordance with the planned urban and industrial development of the Region.

Uniform standards of waste collection, treatment and disposal should apply throughout the Region.

A policy of conservation should be adopted and as far as possible the industrially valuable materials in the refuse should be extracted and the organic content processed with sewage sludge for compost production, and only bulky materials which cannot be reduced by any other means should be burned.

Three separate refuse/sludge composting plants, each incorporating an incinerator for limited use, should be provided at sites to be chosen within the Region.

SUMMARY

Survey

1 Electricity Supply

The Region is served by the 275 KV Super Grid, the 132 KV grid, and the 33 KV systems. West Lothian has its own grid sub-station at Bathgate. Supplies are taken direct from the grid at eleven thousand volts or four hundred and fifteen volts. Very large consumers can be served by a thirty-three thousand volt system which can step down to eleven thousand volts whenever required. A further grid sub-station will be opened at Broxburn in 1966.

The disposition of the grid system relative to the Region can supply sufficient power to cater for an increase in population of 200,000. Negotiations are proceeding to place underground all cables in the Livingston New Town area, but so far agreement has been reached in respect only of circuits up to, and including 11,000 volts. This agreement does not extend to the Survey Area where the Board will not yield their rights to erect overhead circuits wherever they choose, subject to planning permission and wayleaves.

2 Gas Supply

The gas distribution system in the Area is overloaded. Several of the smaller communities in the Area have no gas supply. The Scottish Gas Board has no plans to enlarge the existing distribution grid, nor to extend it to the villages with no gas supply.

3 Water Supply

The existing requirements in the Region necessitate the expansion of the water supply services.

A water scheme in hand at West Water, Peeblesshire is expected to be completed by 1967. The existing water supplies, and those proposed from other sources to serve the needs of the Region, should be fully utilised by 1967. From 1967 additional demand can be met by the projected Loch Lomond Scheme.

The overall total demand for the New Town is estimated at approximately 11 m.g.d., of which 3.5 m.g.d. will be required from the Loch Lomond Scheme.

The Loch Lomond source will be piped to a large storage reservoir in the Eastercraigs area, west of Armadale. From that point, mains will be laid to carry the water to its final destination within the County.

4 Sewerage and Sewage Disposal

The villages situated along the Breach Valley have inadequate sewage facilities to meet their future requirements. A number of villages in the Region continue to employ the system of septic tank disposal, which may cause danger to public health and river pollution.

Midlothian and West Lothian County Councils have agreed to construct a joint sewage disposal works to serve Ratho, Ratho Station, Newbridge, Broxburn/Upshall and Kirkliston. This system will replace a temporary, partial treatment works at Haugh Farm.

A new sewage treatment works is planned near East Calder to serve Livingston New Town, East Calder, West Calder, Pumpherston, Polbeth and possibly Loganlea, Addiewell, and Breich. The works will be constructed in three equal stages for an ultimate population of 134,000 persons, with corresponding provision for industry.

Alternative schemes have been proposed for dealing with Addiewell, Loganlea and Stoneyburn either by an extension of the West Calder Burn Branch sewer into the proposed Addiewell Industrial Site, with pumping stations to discharge the sewage from Loganlea, Addiewell and Stoneyburn to the head of the Breich Valley sewer and hence to the New Town works, or by the development of a new sewage works on the site lying between the railway viaduct and Cuthill Bridge to replace the three existing works in the area.

Any new major development in the Area would necessitate an expansion of some of the existing services and the provision of new ones.

Proposals

1 Electricity Supply

The South of Scotland Electricity Board should be informed at an early stage if a policy of electric heating for houses is to be adopted by Livingston New Town Corporation and/or Midlothian County Council and West Lothian County Council.

Programming of electricity to industrial sites should be undertaken at the earliest stage.

Extreme care must be taken to ensure that overhead cables do not cause considerable damage to the amenities of town and country. Wherever possible these cables should be located underground.

2 Gas Supply

A complete review of the gas supply system for the Region should be undertaken at the earliest stage so that programming of supply can be related to the urban and industrial expansion.

3 Water Supply

The Agencies concerned with Water Supply in the Region should continue to work together in programming water supply with urban and industrial expansion.

The D.S.I.R. should be asked to investigate the pollution of the Region's rivers by the leaching of iron from bing material and from inundated shale mines.

4. Sewerage and Sewage Disposal

The Agencies concerned with Sewage Disposal in the Region should continue to work together in programming sewage facilities with urban and industrial expansion.

Sites for sewage and refuse disposal have been nominated and it is recommended that the organic wastes in the refuse should be treated together with sewage sludge for conversion to compost.

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13. Mr. Covill, Lothians River Purification Board.

Chapter 12. COMMUNICATIONS

INTRODUCTION

This Chapter describes the existing services, routes and terminals of the principal mechanically propelled circulation systems within the Survey Area. An estimate has been made of the probable trends of these modes for the period up to 1985 when the forecast populations for the Town Groups are reached. These trends will be fitted to the present route patterns and, from the inadequacies revealed and direct policy injections, the future circulation pattern will be determined. Proposals are set out for each service.

SURVEY

1 Railway Service

Two railway lines pass through the Survey Area and another skirts the northern boundary. All three connect Edinburgh with Glasgow, and are:

- a the line via Bathgate through the centre of the Survey Area, traversing the New Town Area via Livingston Station.
- b The line via Midcalder and Holytown, passing through the southern part of the Survey Area.
- c the line north of the Survey Area passing through Winchburgh and Linlithgow; it also has a branch routed through Dalmeny over the Forth Rail Bridge to the North.

The Area also contains a number of small branch lines, mineral lines and tramways serving the coalfields, shale fields and other local industries.

The line through the south of the Survey Area does carry passengers but it has been scheduled for passenger service withdrawal in the Beeching Report ('The Reshaping of the British Railways'). At the time of writing this Report, the frequency of passenger services was twelve through-trains on weekdays, with three local trains to Midcalder in the westerly direction, and nine through-trains with three local in the easterly direction, having the following frequency of station stops in the Survey Area:

- 13 at Midcalder/day going west and 10 going east.
- 10 at West Calder/day in both directions.
- 10 at Addiewell/day going west and 8 going east.
- 8 at Breich/day in both directions.
- 11 at Fauldhouse North/day going west and 10 going east.

This line also carries fairly heavy coal freight between the Lothians and the West, with small goods depots at the passenger stops.

The line through the central section of the Survey Area carries no passengers, but does handle fairly heavy freight traffic. It connects to a large goods depot at Bathgate and with smaller depots at Armadale, Uphall and Drumshoreland.

The line north of the Survey Area is the main Edinburgh-Glasgow passenger line, but is of little use to the Area as a commuting line to supplement road traffic, as the nearest stations to Livingston are Linlithgow and Edinburgh.

An investigation made into the frequency of train services in the direction of Glasgow originating at Edinburgh and/or Linlithgow showed :-

- 31 trains on weekdays originate in Edinburgh.
- 10 trains on weekdays originate in Linlithgow.

In addition, twelve of the thirty-one Edinburgh-Glasgow trains stop at Linlithgow. This line also handles freight and has goods stations at Winchburgh Junction, Philipstoun and Linlithgow.

Tables 12.1 and 12.2 in Appendix G give the frequency of passenger services on the two passenger lines and Diagram 12.1 shows the location and comparative frequency.

2 Bus Service

The central and northern sections of the Survey Area are served by a fairly frequent bus service. The principal east/west movement is on the A9, A8 and A71-A705. The main north/south routes are A706, B792, and A767. Large omnibus garages and repair depots exist at Bathgate and Broxburn within the Area and at Linlithgow beyond the Area.

Table 12.3 in Appendix G lists the frequency of bus services in the Survey Area and Diagram 12.2 shows the location and comparative frequency. (Volume I of this Report lists the numbers travelling to Edinburgh at morning peaks in Chapter 12.)

3 Port Facilities

(Chapter 13 in Volume I considers adequately the present and future facilities at these ports, so only a brief summary will be given here.)

The Survey Area has access to three Scottish Ports: Glasgow in the West, Leith in the East and Grangemouth to the North. Glasgow, the most important, is approached by a long tidal dredged channel. As it is at the end of shipping routes, it is very suitable for repair work. Glasgow is considered a medium-sized port handling between six and eight million tons a year.

Both Leith and Grangemouth are well-situated on the Forth for trade with Europe. Leith has the advantage of being eighteen miles 'downstream' from Grangemouth and requires a very short channel to the Forth depths. However, Grangemouth has locational advantages to the Central Scotland hinterland. Leith deals primarily in imports, as the coal exports have declined, whereas Grangemouth handles an excess of exports.

4 Air Facilities

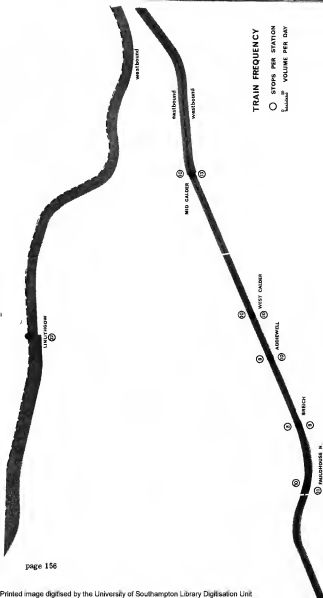
There is a continuing increase in the use of air services in Scotland. The total volume of passengers travelling by British airlines into and out of Scottish Airports shows an increase of eighteen per cent for 1963 figures over the previous year (2). Air freights have increased five-fold over the last ten years. Two-thirds of the total is handled at Prestwick and Renfrew Airports.

Air services for the Survey Area are available at Turnhouse (Edinburgh), Renfrew and Prestwick Airports.

The closest, Turnhouse, on the north-east boundary of the Area, is a local airport connecting London and other parts of England, other parts of Scotland, and Ireland. The airport facilities include a restaurant and bar, available to the general public as well as passengers. Other users of the airport include Ferranti's Flying Unit, the Edinburgh Flying Club, some Executive Aircraft and Chartered Flights.

Present problems at the airport include:

- a inadequate car-parking facilities, due to about fifty per cent of passengers using private cars;
- b occasional denial of use to some aircraft on the north-west/south-east main runway under cross-wind conditions,



c the use of signal-control for motor traffic where the A9 crosses the flight-path to the runway.

The following table shows the large increase in passenger traffic at this airport between 1952 and 1962:

1952	-	31,000	
1962	-	329,600	1063% increase

Freight haulage has also increased.

Renfrew Airport, five miles south-west of Glasgow, is Glasgow's local airport connecting London and other parts of Scotland, England, Wales, Isle of Man, Jersey, Southern and Northern Ireland, as well as small plane international flights to Iceland and France, and to other parts of Europe in the summer. Facilities available at the airport include a large dining gallery open to the public and very modern Navigational Aids. Other users of the airport include private light aircraft, Executive Aircraft, Chartered Flights and the Scottish Air Ambulance Service (Headquarters). The main difficulty at Renfrew is that it is frequently fog-bound, causing diversion to Prestwick or Turnhouse. Both the passenger and freight traffic have shown large increases over the past few years:

Passengers:	1952	-	140,000	
	1962	-	878,000	628% increase
Freight:	1952	-	493 short tons	
	1962	-	4,746 short tons	963% increase

Renfrew now handles more passenger traffic than any other Ministry of Aviation Airport except London.

Prestwick Airport is the largest and most fully equipped of the three for handling long-range international traffic. The airport facilities have recently been improved with the opening of a permanent terminal. Other users of the airport include Chartered Flights, factory and aircraft maintenance works of Scottish Aviation Limited, Air-Sea Rescue Unit and the Military Air Transport Service of the U.S. Air Force. Prestwick, chosen originally for its unusually favourable weather conditions, has maintained an excellent record for freedom from fog and at times has been the only airport open in Western Europe. Prestwick's passenger and freight traffic has shown similar increases to the other two airports:

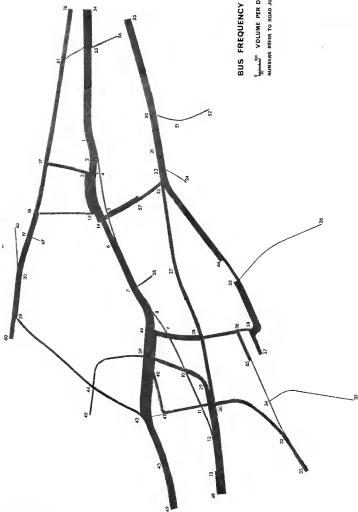
Passengers:	1952	-	169,000	
	1962	-	349,000	207% increase
Freight:	1952	-	669 short tons	
	1962	-	2,885 short tons	531% increase

International services will now be augmented by the daily all-year-round passenger flights to New York and a ten-a-week frequency to Canada. Serious disadvantages of Prestwick Airport are distance and inaccessibility from the Lothians Area, and from both Glasgow and Edinburgh.

The development of a new airport for Glasgow at Abbotsinch two miles west of Renfrew is well under way to completion in 1966. Abbotsinch will in due course replace Renfrew, whose runway will be used as a new road for carrying passengers from Glasgow to the new airport.

BUS FREQUENCY

$\frac{1}{2}$ VOLUME PER DAY
 NUMBERS REFER TO ROAD JUNCTIONS



0 10 20 30 40 50 60 70 80 90 100
LOST PICTURE PILE
16 HOUR DAY

page 150

Since the Survey Area lies in a two-thirds/one-third distance relationship between Glasgow and Edinburgh, it is traversed by major corridors of movement between these two cities. The main corridor is the Trunk Road (A8) which enters the Survey Area at Ingliston and leaves at Harthill, passing near Newbridge, Broxburn, Uphall, Bathgate and Whitburn. It is a three-lane single carriageway to Harthill where it joins the recently opened Harthill by-pass, a two-lane dual carriageway. Censuses taken in 1954 and 1961 at five points in the Area show an increase in passenger car units (pcu's)* of over fifty per cent at four of the five points. The total volume of pcu's at four points in 1961 varied between ten thousand seven hundred to thirteen thousand per day, exceeding the estimated design capacity* of the road of eleven thousand pcu's. The fifth point is known to be the low one, as it is located near Bathgate/Armadale, and reflects the turning movements into this Area. Diagram 12.3 and Appendix G, Table 12.4, give existing traffic volumes and comparative figures respectively: the composition of the volume on A8 shows a greater number of heavy goods vehicles than cars, relative to pcu counts (see Diagram 12.4).

A second corridor of east/west movement from Edinburgh to Stirling (A9) just passes through the northern part of the Area. It is a two-lane single carriageway and enters the Area at the western fringe near Edinburgh Airport, passing through the centres of Kirkliston and Winchburgh, and out of the Area at Burnside, on its way to Linlithgow. It is the only other Trunk Road in the Survey Area which carries similar amounts of traffic to the A8, and has shown about the same increase over the seven year period, but carries fewer heavy goods vehicles (see Diagram 12.4). As this road has only two lanes and carries as much volume as the three-laned A8, it far exceeds its estimated capacity (nine thousand pcu's). (Refer to Table 12.4, Appendix G, and Diagram 12.5 for volume data.)

The third main east/west corridor is the Class I road A71, which is parallel with the A8 but to the south of the Survey Area. It enters the Area at Burnwynd and leaves at Maudron Bridge passing through East Calder, Midcalder, Polbeth and West Calder, by-passing Addiewell and Faldhouse. It has a two-lane single carriageway, carrying between five thousand five hundred and seven thousand eight hundred pcu's in 1963 between its entry point into the Area and the junction with A767 and A705; to the west of this junction it decreases considerably. Since the estimated capacity of this road is six thousand pcu's, the eastern section within the Area is congested. This road has shown a phenomenal average increase in volume of traffic of eighty per cent in the period 1954-1963. This has resulted mainly from the increase in commuting to Edinburgh, as can be seen from the greater number of cars compared with

* A unit used in traffic surveys to relate all traffic to the equivalent of motor car units. The following values were adopted here:

Motor Cycles, Cars, Light Goods	1.0 pcu
Buses and Heavy Goods	3.0 pcu
Pedal Cycles	0.5 pcu

x The estimated design capacity is for free flow of vehicles based on road width. No allowance has been made for built up areas or for poorly aligned sections of the routes or for junctions.

other vehicles, shown in Diagram 12.4. (Refer to Table 12.4, Appendix G and Diagram 12.3 for volume data.)

The fourth main corridor is the A70, which passes through the southernmost part of the Area and veers off to the south-west. It enters the Area at the House of Muir and leaves at Maiden Hill. It is a two-lane single carriageway which carries very little traffic until it approaches Edinburgh. This road has had more than an eighty per cent average increase, but its 1954 volumes were very low. It is at about two-thirds of estimated capacity near Edinburgh, but only one-sixth throughout most of the Survey Area. (Refer to Table 12.4, Appendix G, and Diagram 12.3 for volume data.)

There are several other minor east/west Class I corridors that either serve as connectors between east/west and north/south movement or branch off the main corridors: A89, A899, A705 and A704. A89 branches off the A8 south of Bathgate, passes north through the centre of the town, then westwards through the centre of Armadale, and out of the Area at Westrigg. Within most of the Area, its width has been improved to a three-lane single carriageway. It carries very heavy traffic off the A8 and through the centres of the towns but decreases rapidly after it leaves the Survey Area. It has increased its traffic load, on average, by about sixty per cent over the nine year census period but, as a result of improvements, it is below its estimated capacity at the point of heaviest volume.

A899 branches off the A8 to serve Uphall and Broxburn before rejoining the A8. Since its carriageway is similar to the A8, and it only carried five thousand five hundred pcu's in 1963 (having increased by sixty per cent since 1954), it is well below its designed capacity.

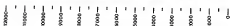
A705 branches off the A71 east/west corridor at Midcalder. It is a two-lane single carriageway which passes through the villages of Livingston, Seafield, Blackburn, East Whitburn and Whitburn to join the A8 west of Whitburn. This road carries about four-fifths of its estimated capacity from Blackburn through Whitburn to the A8, and this section has shown a seventy five per cent increase over the nine year census period. The use of the rest of the road is about fifty per cent less than capacity.

The last is the A704, a connector between the A71 and the main north/south corridor, the A706. This branches off the A71 west of East Calder, joining the A706 near Rashiehill Muir. This road is very underused - less than one-tenth of its estimated capacity. (Refer to Table 12.4 in Appendix G and Diagram 12.3 for volume data on these four road sections.)

Such a strong east/west movement suggests that north/south corridors exist mainly as a means of connecting them. The only Class I connection passing through the Area is the A706, coming from Linlithgow into the Area just north of Armadale, continuing southwards through Armadale to cross the A8, then through Whitburn, finally leaving the Area at Bye Law Hill. This road is very near its estimated capacity from Whitburn to the Area's northern boundary and serves as a main distributor of traffic off the A8. The volume of traffic on this road has increased at an average of one hundred per cent between 1954 and 1963. It carries an equal number of heavy goods vehicles and cars (Diagram 12.4). (Refer to Table 12.4 in Appendix G, and Diagram 12.3 for volume data.)

Shorter north/south connectors are the A800 and the A767. The former branches to the south-east from the A706 as it enters the Area and passes into Bathgate to join the A89. This road carries just over one thousand five hundred pcu's and is well below capacity. The A767 connects the A899 at Uphall with the A71 at Midcalder

PC-USA per 15 hour day



COMPOSITION OF EXISTING TRAFFIC VOLUMES

- A MOTOR CYCLES
- B CARS
- C BUSES
- D LIGHT GOODS
- E HEAVY GOODS
- F PEDAL CYCLES

passing through Station Rows and Pumpherston. This road carries about fifty per cent of its estimated capacity of six thousand pcu's, having increased by about fifty per cent since 1954. (Refer to Table 12.4 in Appendix G, and Diagram 12.3 for volume data for these two roads.)

Class II and Unclassified roads are not reviewed here, as the last traffic survey was taken in 1935. Those roads in need of drastic upgrading will be dealt with later in this Chapter.

6 Circulation Patterns

The movements of people within the Survey Area are divided into those whose origin and destination are within the Area and those who originate in, or are destined for, the Area. The journeys between home and work-place involve movement within a particular town in the Survey Area; movement between towns in the Area; movement from an Area town to places outside the Survey Area; and movement to places of work within the Survey Area from outside its boundary. These movements are principally by bus, train and car. Similar movements arise from journeys between home and schools, journeys for shopping, journeys for recreation or social functions, service journeys for professional purposes, and journeys by supply transport from wholesalers, retailers and manufacturers.

As car usage has increased and railway facilities have decreased, the existing road structure within the Area has been more intensely used and this has resulted in congestion at several of the town centres, especially during peak hour flows; several of the main corridors of movement are also approaching their design capacity. This has decreased the accessibility between towns, and within towns, and has created difficulties in access to individual premises. At the same time, congestion has affected the amenities of urban environments within the Area (see Diagram 12.5 for congested road sections).

PRINCIPLES AND ANALYSIS OF TRENDS

1 Railway Service

When the local passenger stations on the Edinburgh-Calder-Glasgow line are closed (as planned by British Railways), rail services as a means of public transport within the Lothians Survey Area will virtually come to an end. The justification for this is that an uneconomic slow-stopping service cannot compete with the flexibility offered by buses and cars. Volume I of this Report contains an investigation into the feasibility of re-opening passenger services on the Edinburgh-Livingston-Bathgate line. The general conclusion is that even the increase in population envisaged in the Survey Area cannot economically support a commuting service on this line (see Appendix of Chapter 12 in Volume I).

Both British Railways' present policy and Volume I suggest that, if the trend away from rail services as a mode of mass transit is not reversed by non-economic forces, it can be expected to accelerate. If it is socially necessary to augment road transportation, economic profit and loss factors must not be the only considerations.

2 Bus Service

The flexibility of buses allows them to serve changing centres of population and to provide routes in accordance with desire lines. The bus companies are prepared to enter into a new phase of expansion when the proposed population immigrants enter the Area.

Present trends do not envisage a new type of vehicle for mass movement, nor a new system of passenger collection, nor new corridors of movement, but all these will undoubtedly become necessary to meet the needs of greater flexibility and convenience for large numbers of people.

3 Port Facilities

(Refer to Chapter 13 in Volume I of this Report for a detailed analysis of the trends.)

Present economic trends stress the importance of exports for the welfare of Great Britain and suggest that Glasgow, Grangemouth and Leith will become increasingly vital in the development of the Survey Area.

4 Air Facilities

The present trend of passenger and freight usage of air facilities is the demand for fast, direct and reliable terminal facilities and flights. Certainly an attempt to come to terms with this demand at the three airports serving the Area would greatly encourage the development of industry and commerce. Turnhouse Airport has plans for expansion to meet some of these demands.

5 Roads

The number of vehicles expected within the Survey Area by 1985 has been estimated and the impact analysed in Volume I of this Report. Volume I makes two basic assumptions on the level of car ownership in initial stages of population movement into the Survey Area and on the proximity to saturation point when the proposed population increases have been reached (see Chapters 12 and 3, Volume I).

The results of this investigation substantiate those in Volume I that the car is going to be used in its same basic form for at least the next twenty years.

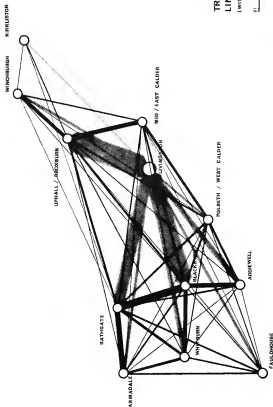
Professor Buchanan in 'Traffic in Towns'⁽³⁾ stated that "there are so many advantages in a fairly small, independent, self-powered and highly manoeuvrable means of getting about at ground level, for both people and goods, that it is unlikely that we shall ever wish to abandon it". W.K. Śmigielski in the 'Leicester Traffic Plan'⁽⁴⁾, published in October, 1964, further supports the assumption of the continuing and increasing use of the car by accepting that it would remain in use within the city area over the next thirty years and even where far more efficient modes of public transport could be utilised.

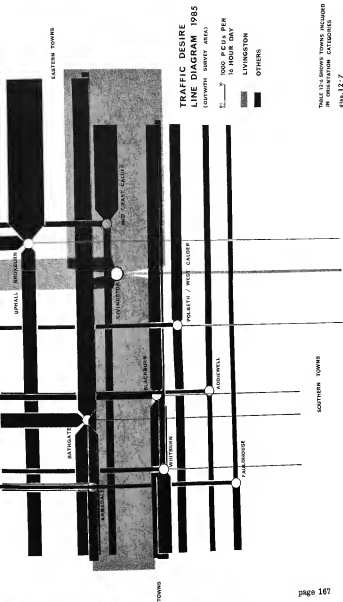
Once the assumption of this continuing trend had been made, a study was carried out to show the patterns of movement desired by the proposed population by 1985. The assumptions of general planning policy, population and land use allocation, vehicle ownership rates and a study based upon the Newtonian Law of Gravitation (undertaken by the Roads Division of the Scottish Development Department) enabled trip generation estimates to be made.

The procedure was as follows:-

Population: The 1985 population allocation by Town Groups was assumed as the base, since traffic generation and movement within a particular town is considered in the Chapter dealing with the towns.

Land use: Land use proposals within the Area for 1985 were assumed as the basis for traffic generation.





Rate of Vehicle Ownership: (Discussed in Chapter 12 of Volume I).

Traffic Generation Model: The Roads Division of the Scottish Development Department prepared a study of traffic patterns generated by the interaction of the new or expanded towns with each other, and with towns outside the Survey Area. These patterns were determined by a gravity model formula.*

The traffic patterns generated by the proposed New Town and the Town Group populations were related to the proposed land uses to produce two traffic desire line patterns of the 1985 population of the Lothians Survey Area. The first shows the desire of the 1985 population for journeys within the Survey Area (see Appendix G, Table 12.5 and Diagram 12.6); the second shows the desire for journeys which have their origin or destination outside the Survey Area (see Appendix G, Table 12.2 and Diagram 12.7).

The combination of the two Tables gives a broad indication of the traffic generated by the populations and land uses within a particular Town Group. Livingston New Town generates thirty four thousand, five hundred and ninety pcu's/16 hour day for local movement and eighty five thousand, one hundred and eighty pcu's whose origin or destination is outside the Survey Area. This amount of traffic (one hundred and twenty thousand pcu's/16 hour day) will demand to enter or leave the New Town by 1985 and to travel around, into or out of the Survey Area. The magnitude of the traffic problem created by a trend for high vehicle ownership with little public transit can be seen by comparing the 1985 volumes with the maximum volume on the A8 in 1981 (thirteen thousand pcu's/16 hour day) and others in Tables 12.5 and 12.6 in Appendix G.

6 Circulation Pattern

The trends discussed in the foregoing sections suggest that by 1985 the volumes of traffic wanting to use the road system in the Area will be of a phenomenal magnitude compared with the present volumes. This magnitude is not expected to be diminished by mass transit on another corridor of movement, as local train passenger services are likely to cease and will be largely replaced by bus services which use the same corridors of movement as cars and lorries.

PROPOSALS

1 Railway Service

One specific rail recommendation is made: that by 1975-80 some form of passenger service should exist on the Regional railway corridors of movement. The use for this purpose of a railway loop linking Edinburgh-Livingston Station-Bathgate-West Calder-Midcalder -Holytown-Edinburgh should be investigated and, if appropriate, safeguarded for an ultimate commuter service within the Lothians Region and between the Region and Edinburgh. This will not only decrease the anticipated volumes of road traffic, so relieving congestion (or alleviating expenditure on road building),

* While the reputed sources of error within the gravity model concept were realised (the definition of 'distance', the correct 'power' to which the distance is raised, and the determination of a constant to take account of both the interactions of adjacent communities to the two communities whose direct reaction is being determined and the fact that conditions of the communities at present will differ greatly in the future), it was decided to accept the results of this study as yielding a rough guide to the traffic pattern desired by a new population in the year 1985.

but will also help to preserve a reasonable living and working environment within the Region. These advantages will certainly not be a direct benefit to British Railways, but, since the community will profit from such a service, means of determining the social cost/benefit must be found and apportioned judiciously.

2 Bus Service

No further proposals are made in this Report since the bus companies are willing to increase frequencies, routes and depots as the population expands.

3 Port Facilities

Specific proposals are given in Chapter 13 of Volume I. No further proposals are made here except to stress the importance of the ports to the success of the Lothians Region as an Industrial Growth Area.

4 Air Facilities

Turnhouse Airport proposes an extension to its terminal buildings and apron, a new runway and improvements in passenger and freight handling facilities. It is strongly recommended that these proposals proceed as rapidly as possible, for this airport is of great importance to the growth of the Survey Area.

Abbotsinch, the new Glasgow airport, is to be completed in 1966, and Prestwick has plans for internal improvement. Increasing air traffic using these airports will require improved road connections which should extend into the Survey Area.

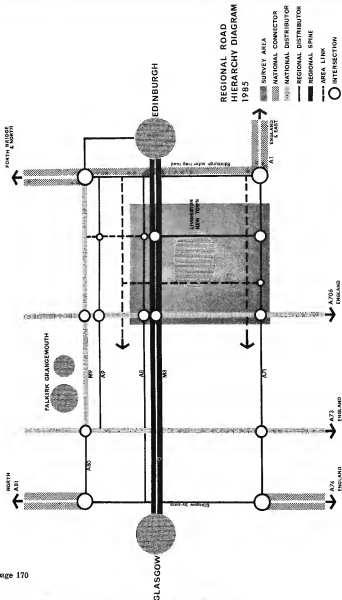
5 Roads

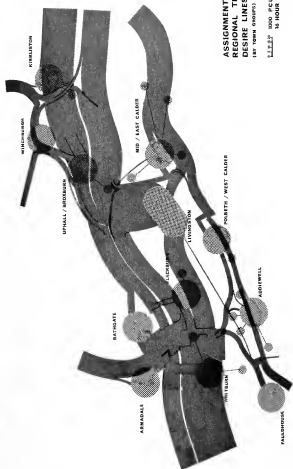
The dramatic increase in the numbers of journeys by 1985 suggested that the approach to the solution for accommodating them must begin with a proposal for an hierarchical road system within Central Scotland, encompassing the Survey Area (see Diagram 12.8). This has been done by classifying roads into National Connectors, Regional Distributors and Area Links.

The principal function of the National Connectors is to move traffic into and out of the Region of Central Scotland from the South and North. The Regional Distributors interlink the Urban and Growth Areas within the Central Scotland region. Within the Survey Area, Area Links connect the towns with each other and with industrial zones.

The volumes shown on the Traffic Desire Line Diagram (Diagram 12.7), which originate in, or are destined for the Survey Area, were assigned to the National Connectors and the Regional Distributors as far as possible (see Diagram 12.9). Some movements had to be accommodated on local Area Links. Similarly, the volumes of movement between the Town Groups within the Survey Area were assigned to the Area Links as far as possible, but a small proportion had to be assigned to the Regional Distributors when Area Links were either not available or were not the most direct routes available (see Diagram 12.10).

The estimated total volume of traffic generated within the Survey Area in 1985 by the population and land use were assigned to the existing roads and to known Government road proposals. From this study the following specific Survey Area proposals were evolved. (These proposals are shown on the Advisory Master Plan for the Lothians Region.)





National Connectors

A706. The volume assigned to this major north/south corridor of movement of traffic originating in, or destined for, the Survey Area suggested that a new line for this route was needed from its present entry into the Area north of Armadale to the point at which it connects with the A71. Not only is the volume of traffic too large to enable urban amenities to be preserved, but the existing road would not be able to carry this traffic and function as the major interchange between the A8 and M8. It is therefore proposed that the A706 be realigned to by-pass Armadale, as suggested by Sir Alexander Gibb and Partners.⁽⁵⁾ The new road would require two partial interchanges allowing for northward movement from Bathgate and Armadale; and a full interchange of modest proportions at the B708, a town distributor road linking Armadale and Bathgate. This new route would connect with A8 and M8 (as shown on Scheme A, Drawing No.6, of Sir Alexander Gibb and Partners' Report to West Lothian County Council⁽⁵⁾) by two interchanges which would provide the only complete movement between the A8, M8 and surrounding roads to be found within the Survey Area, and the first west of Edinburgh. The new route would continue southwards with an interchange at the A705 and sliproads off B7015, linking Addlewell and Fauldhouse, until finally intersecting with A71. The design standard adopted for this proposal (1,500 pcu's/lane/hour, travelling at 50 mph) indicates that this new road needs to be a two-lane dual carriageway.

Regional Distributors

M8. The necessity for a road of motorway standards connecting Edinburgh and Glasgow is borne out by the volumes of traffic shown on Diagram 12.7, bearing in mind that these volumes do not show through traffic. The alignment is that proposed by Sir Alexander Gibb and Partners: "Pass north of Whitburn and Blackburn, through the northern fringe of the designated area of the New Town of Livingston and south of Uphall/Broxburn"⁽⁵⁾. In addition to the full interchange with A706 to serve Bathgate, Armadale, Whitburn and Blackburn, there is a limited access interchange near Dechmont; it does not cater for traffic entering it from the north, nor therefore from A8. It is proposed as a two-lane dual carriageway from the present Harthill by-pass to Newbridge.

M9. This proposed Motorway between Edinburgh and Stirling passes north of the Area until it comes south near Winchburgh to join the M8 at Newbridge, with a partial interchange to the Forth Road Bridge between Winchburgh and Kirkliston. It will certainly carry through traffic, but its usefulness to the Survey Area is directly related to its access points near the Area and to the M8. This will be a two-lane dual carriageway.

A8. The Scottish Development Department stated that the line of the M8 should be such that the A8 alignment is retained⁽⁵⁾, and that room is allowed for expansion. The A8 would remain a three-lane carriageway with several of the minor cross-roads terminated, until local traffic requires that it be improved to a two-lane dual carriageway. By 1985, it is estimated that this road will need to be of dual carriageway standard with interchanges at:-

- a the intersection with the old A706 to serve Whitburn, Armadale and the industrial sites in Armadale and Bathgate;
- b the intersection with the new A706, as proposed by Sir Alexander Gibb and Partners⁽⁵⁾;
- c the intersection with B792 as access to Bathgate, the B.M.C. factory, other industrial sites and Blackburn;

- d the intersection with the New Town's western north/south road at Starlaw, as proposed by Sir Alexander Gibb and Partners (5);
- e the intersection with A899 to give access to Bangour Hospital, Uphall and Broxburn;
- f the intersection with the New Town's Spine Road at Dechmont, as proposed by Sir Alexander Gibb and Partners (5);
- g the interchange in East Broxburn with a new industrial distributor road to serve industrial land and accommodate commuting traffic both north and south of it.

A9. This is proposed to remain, to serve as a collector and distributor of traffic to the Forth Road Bridge, to interchange with the M9, to give access to Turnhouse Airport and to travel towards Linlithgow.

A71. The increased demand placed upon this road by the population of the New Town and the population expansions in Mid and East Calder and Polbeth (see Diagram 12.7) dictates that by 1985 a new three-lane dual carriageway will be needed from Edinburgh to Livingston; west of Livingston only two lanes will be required until it rejoins the present A71 west of West Calder. The new alignment would pass north of Kirknewton and south of Mid and East Calder, Livingston New Town, Polbeth and West Calder, and will relieve towns of congestion and danger from through traffic. The road interchanges south of Addiewell with local roads to the north and south; with the Livingston west and east north/south routes; with an intermediary Livingston town distributor road, and with B7031 to the Calders and Kirknewton, whence it continues to the east on an alignment following the railway.

A70. No major improvement is proposed for this route, as it passes over high ground and is not anticipated to attract more north/south traffic than it can cope with. It will continue to offer an alternative to A706, A702 and A71.

A89. No major improvements are proposed for this recently improved road, as it will be able to cope with estimated 1985 volumes.

Area Links

A705. Diagrams 12.6 and 12.7 show the demand placed upon this road as a result of the population increases and development in the New Town, Blackburn, and Bathgate, by 1985. Reasons for this are:-

- a the direct link it offers between the western part of the New Town and Blackburn, with the new A706 for movement to the industrial sites in Armadale, Bathgate and to the Falkirk-Grangemouth Growth Area;
- b the desire for the population of the western part of the New Town to interchange with M8 on the A706;
- c the attraction between Blackburn and the New Town.

For these reasons the A705 is proposed to be upgraded to a two-lane dual carriageway by 1985 between Livingston New Town and the junction with the A706. West of this intersection, the road is proposed to remain as a two-lane single carriageway which passes through Whitburn on a new alignment, by-passing the centre. It is proposed to close the 'V' intersection with the A8 west of Whitburn as the road would provide a very direct route to the western part of the New Town, and therefore would attract too much traffic through Whitburn and Harthill. A traffic assignment with the intersection open produced

a volume so large that any hope of maintaining a reasonable living and working environment was impossible.

A767. No major proposals are made for this road. As it does not intersect with either the A8 or M8, it will continue to serve a local population movement between the Uphall/Broxburn Town Group and the Calder. A slight increase might appear on parts of it as a result of the new local industrial and commercial road proposed to the east, which intersects with the A8 at East Broxburn.

A800. No proposals are made as this road is adequate to carry the 1985 demand.

A899. This will be more fully dealt with in Chapter 14, but it will become imperative by 1985 to modify the present connections of this road with the A8 by joining it to the proposed intersection at East Broxburn and to a partial intersection at Uphall, allowing access to Bangour Hospital from the west.

New Road. A road is proposed to proceed northwards as a continuation of the New Town spine road, bypassing Uphall/Broxburn in an arc to the north-west, and then to continue due north to intersect with A9 west of Winchburgh. A continuation of the above arc to the east of Broxburn produces a local industrial and commuting service road which intersects the realigned A8 at the East Broxburn interchange and then continues serving the same function as it curves to the south-west to join the A767 and Livingston New Town road system.

A704. No proposals are made as the road is adequate to cope with the estimated demand in 1985.

New Road. An industrial distributor and commuting loop road to the south of A71 is proposed to connect the east and west interchanges of the New Town road system on the realigned A71.

B792. The increases in the Bathgate, Blackburn, West Calder and Polbeth populations will, it is estimated, produce a 1985 demand that far exceeds the present road capacity. This road is therefore proposed to be improved to Class I standard by 1985 and to be re-routed to by-pass Blackburn, giving access to the Bathgate industrial complex.

B8046. This road is proposed to be modestly realigned and improved to Class I standard by 1985. The expanded population in Ecclesmachan and the increased use of the road as a northern corridor of movement by the Uphall/Broxburn and new village populations place an estimated demand on this road which requires alleviation by 1985.

B7015. This road is proposed to be improved to provide western access to Livingston New Town Centre.

New Road. Improvement and extension is proposed for the Class III road, running southwards from East Calder via Oakbank to link with A70, to cater for traffic to the proposed recreation centres of Cobbinshaw and Harperrig.

No specific proposals are made here for the other Class II roads, or for the Unclassified roads in the Area.

Town Roads

The detailed design of roads passing through urban areas, together with nearby major roads, is dealt with in Chapter 14, which has borne in mind the need to provide good accessibility and to improve the living and working environments of each urban centre.

6 General Conclusions

The initial assumption of this study (that the motor vehicle is here to stay) has led to projected volumes of traffic which are unbelievably high. The acceptance of this assumption requires that means of accommodating the motor vehicle are found which do not adversely affect either human life or the environment. This has been the basic aim of the road study.

The methods and available statistics used in this Chapter have produced a rough guide to the traffic pattern desired by the new population in 1985. It is, however, essential that further research into the actual patterns of movement generated by the new population in the Area be conducted at regular intervals. Studies are needed into the quantitative relationships between land use and traffic generation; between mass transit and traffic volumes; and between motor vehicle and environment. Only if these investigations are applied periodically over the next twenty years, and related to the habits of the population living in the Area, will accuracy and reliable predictive value be given to the proposals set out in this Chapter.

SUMMARY

Introduction

A communications system must provide complete inter-accessibility between land uses. This Chapter describes existing facilities and the future pattern required, as calculated from projected trends and influencing policies.

Survey of Present Conditions

Railway Service. There are three services between Edinburgh and Glasgow, all carrying freight and, except for the central routes, providing passenger services. The southern route is scheduled for closure. The northern route is part of a main line passenger service but the stations are not convenient for the Area. Branch lines and industrial tramways also exist in the Area.

Bus Service. A network of services extends over the whole Area but two main corridors of movement are north/south and east/west.

Port Facilities. Three ports are accessible: Glasgow, Leith and Grangemouth. Leith and Grangemouth are well-situated for European trade; Grangemouth has locational advantages for the Area.

Air Facilities. Both passenger and freight volumes increase annually. Turnhouse (Edinburgh) provides inter-city services only and, although it is to be expanded, is at present under-used and has several inadequacies. Renfrew (Glasgow) handles large volumes of varied traffic and short international flights, but is often fog-bound. Prestwick, the best equipped, offers long-range international flights and has a good weather record, but is not readily accessible from the Area. A new airport at Abbotsinch (Glasgow) is under construction, and will eventually replace Renfrew.

Roads. Four main corridors of east/west movement between Edinburgh and Glasgow traverse the Area: A8 and A9 (Trunk) roads both carry volumes of traffic which for long sections exceed their designated capacities, and A71 and A70 both carry heavy traffic on their eastern sections due to Edinburgh-bound commuters. A706, the main north/south route, is nearing capacity where it connects with A8.

Circulation Pattern. There are two main movements: traffic with origins and destinations within the Area and traffic with origins and destinations outside the Area. With increased car usage and reduced rail facilities, the road structure has become inadequate; town centres become congested with peak hour flows and environmental conditions are deteriorating.

Principles

Railway Service. No passenger routes will conveniently serve the Area when the Calders line is closed to non-freight traffic (see Volume I). A desirable alternative may be in due course to reopen the Edinburgh-Livingston-Bathgate line to passengers and to extend this line on an existing loop to connect with the Addiewell-West Calder-Kirknewton line to Edinburgh.

Bus Service. The flexibility of this method of mass transportation has the advantage of accommodating the changing requirements of passenger volumes and routes.

Port Facilities. All three ports are expected to increase in importance with the industrial growth of the Area.

Air Facilities. Industrial growth would be encouraged by improved facilities.

Roads. It is assumed that the motor vehicle will remain in predominant use for many years, because of its flexibility and convenience for transporting people and goods. Professor Buchanan's principles of tailoring accessibility to preserve environmental quality have been adopted in the proposals for the Town Groups (Chapter 14). Movement trends based on population, land use and vehicle ownership rate have been projected by the use of a gravity model formula to give a guide to the traffic patterns desired by 1985.

Circulation Pattern. The phenomenal magnitude of projected 1985 traffic volumes is aggravated by the loss of alternative methods of non-road-using mass transportation.

Proposals

Railway Service. The social benefits resulting from the alleviation of road congestion and loss of environmental amenity indicate the need for eventually providing a mass transit rail link between Greater Livingston and Edinburgh (see also proposals for rail services in Volume I).

Bus Service. Services should be expanded as the need arises.

Port Facilities. The importance of port facilities is stressed (for specific proposals, see Volume I).

Air Facilities. Turnhouse Airport has outstanding advantages for the growth of the Region; the proposals to improve its facilities should be implemented as soon as possible. Accessibility by road to Prestwick Airport should be improved.

Roads. The adoption of an hierarchical attitude to the road system is recommended as follows: 'National Connectors' to provide for the main north/south movement (A706); 'Regional Distributors' to link Central Scotland regional nodes (M8, M9, A8, A9, A71, A70, A89) and 'Area Links' to provide for inter-Area movement between urban and industrial zones. Specific proposals are shown on the Advisory Master Plan for the Lothians Region; these will accommodate the total volumes of traffic generated by population and land uses by 1985 on major roads and on roads within towns where the environmental standards are preserved. Periodic investigations will be needed into the relationship between traffic generation, methods of transportation and the effect of traffic on human life and the environment, in order to verify the validity of present calculated trends.

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Chapter 13. RECREATION

INTRODUCTION

This Chapter is based on the Report of the Special Committee on Recreation set up by the Working Party on Recreation. A list of members of the Committee is given in the Preface and is hereafter referred to as 'the Committee'.

The Committee was asked by the Consultants to make a study of recreation in the Lothians Region; to examine the physical resources available; to estimate the needs of the proposed population, and to consider the problems of providing new facilities.

SURVEY

The Area is characterised by the following land use types:-

1	Natural Areas	} See Map 2.4 'Topography'. Map 15.1 'Landscape Analysis'. Map 7.1 'Rehabilitation'.
2	Moorlands	
3	Agricultural Land	
4	Industrial Dereliction	
5	Urban Areas	

Each area of land is suited to certain outdoor recreational opportunities. Each type of land is able to absorb a certain number of people and their transport for recreation without damage and without coming into conflict with the demands of the other land uses.

1 Natural Areas

There are no untouched natural elements in the Survey Area. There are no 'Nature Reserves' nor any 'Sites of Special Scientific Interest'.

However, wild plants and animals do occur and some are rare in Britain. Where the components of natural communities still exist, they are referred to as Natural Areas (see Map 3.2), but to some degree they all have been influenced by man, and should be referred to as semi-natural areas. They are mainly in fragments scattered throughout the Area, and are to be found at river-sides, in marshes, hedgerows, road verges, waste grounds, old quarries and disused railway embankments. Natural aquatic environments are often best represented in the Area by man-made areas such as reservoirs, canals and flooded quarries.

2 Moorlands

In general, these are the uplands of the Pentland Hills and the Fauldhouse Moors, devoted mainly to hill farming, forestry and water catchment. They are the areas above eight hundred feet shown on the Landscape Analysis Map (Map 15.1). Their present recreational use is hill walking, with occasional shooting. The reservoirs and some of the streams are used for both club and licence fishing.

3 Agricultural Land

These areas are to be found in the Almond basin, and the lower slopes of the Pentlands. (see Map 4.1 - Agricultural Fertility, Map 15.1 - Landscape Analysis, and Chapter 4 - Agriculture). Occasional camping by youth organisations and hunting are the only organized sports in this type. Rights of way and walk-ways along disused railways and the Union Canal are well used by local inhabitants, and the few people from Edinburgh who know of them.

4 Industrial Dereliction

These areas are shown in detail on the Map 7.1 - Extent of Rehabilitation, and consist mainly of the spoil from the extractive industries, e.g. at Broxburn, Niddry Castle, Pumpherston, Uphall, Deans and Seafeld.

Their present use for recreation is limited to free play by the local youth, and occasional football on the level ground at their base.

Some of the disused water-filled quarries are used for swimming.

The location and space devoted to public recreation is detailed in Appendix H - Recreation.

These areas are occupied by the traditional urban open space land uses of parks, pitches, bowling greens, etc.

PRINCIPLES

Recreation has become recognised as a desirable, even essential part of normal living. It requires three ingredients: an individual or group seeking recreation; sufficient time to enjoy and participate in favourite recreations; and a place (including proper area, setting and programme) where recreation can be accommodated.

The first ingredient is the increase of population planned for the Region; the second is assumed from existing national trends and observations; it is the third that is the main concern of this Chapter, place.

In the consideration of recreation planning for the Area, the Committee was aware of the value of recreational 'centres' as a basic element of a leisure need. Because of the rapid changes expected to take place in the population structure of the Region, e.g. changing jobs, places of residence and social affiliations, the recreation and community facilities will be used daily to facilitate the integration of families into unfamiliar surroundings. Recreation and community facilities must be provided, but provided in an accessible and inviting way, to serve as social stabilizers in an area which will be characterized by accelerated immigration.

The Committee has evolved Principles of Recreation Planning which form the basis of its recommendations.

Principles are concerned with the broader aspect of planning facilities for recreation and largely embody the accepted philosophy of recreation. Here they are presented for the guidance of those concerned with shaping the recreation system. From these principles space standards for recreation are evolved. The Committee, in setting down the 'Principles and Space Standards', emphasise that they apply only to the Survey Area.

The five factors which influence the recommendations of principles are: Accessibility; Flexibility; Eye Appeal; Integration; and Carrying Capacity.

1 Accessibility

Recreation space indoors and out of doors must be planned and integrated to offer a complete range of physical recreation for the community, for the expert and for the novice, for the spectator and for the player, for the old, middle-aged and the young. Facilities will need to range from sports arenas to quiet gardens, and from formal play and training areas to informal playgrounds. Accessibility should be offered both to the vehicle and to the pedestrian. The use of the motor vehicle for leisure purposes is increasing, but there are members of the community who are too young or too old to drive or who just 'enjoy a walk'.

Playing fields several miles from home will only be used by enthusiasts. Recreation space is not a clinic for delinquent boys and girls, but close proximity of playing fields could aid the social problems of youth. It is also necessary to have children's playgrounds and open space for old people close to housing and built-up areas where casual supervision is provided.

2 Flexibility

Within the next twenty years the population of the Area and its recreation habits will change. It will follow that the use made of recreational areas may also change. Since the location of a park would be fixed and development would take place around it, it is unlikely to be able to be increased in size; it is then only possible to rearrange the various areas and facilities within the park.

Although the principles are concerned in general with parks on one site, it must be remembered that although it may be ideal for flexibility, it may not be possible to secure sufficiently large tracts of land to make the provision of a 'composite park' possible. Consequently, it may well be that the community recreation provisions will have to take the form of a collection of individual facilities scattered throughout an area. Where recreational facilities are to be dispersed, their location must be determined by accessibility and management arrangements.

3 Eye Appeal

Parks should be attractive and should solve the practical problems of space arrangement, circulation and construction. Areas planted in lawns and trees require the best care; buildings must be kept clean, serviced and in good repair.

4 Integration

The effectiveness of any particular recreational area depends upon its being carefully related to other recreational facilities, since the uses of each site as a separate unrelated area almost inevitably result in the selection of sites that are too far apart or too close together or unrelated to school and cultural facilities.

In order to obtain the full social utility of each recreation park, recreational areas should be considered as a unified system, serving the whole of the Survey Area. This will avoid overlapping of provision and provides for an equal standard of accessibility according to the density of population. These recreation areas should be physically linked by recreational routes.

The land included in this recreation system is but one element in the Lothians Regional Plan. Recreation areas can be located advantageously only by considering their relation to residential areas, schools, shopping facilities, industrial areas and the roadway system.

5 Carrying Capacity

Each area of countryside is suited to certain types of access for outdoor recreation and education purposes, and is able to absorb a certain number of people and their transport without damage. This carrying capacity can be defined in two ways:-

- a The maximum human use over a given period of time that a particular landscape has the ability to absorb while maintaining its primary qualities and characteristics.
- b The maximum human use that is compatible with the quality of recreation experience desired by the user.

PROPOSALS

The proposals that follow have been incorporated and shown in the Advisory Master Plan for the Lothians Region and in the Advisory Plans for the Town Groups. They fall into two main classes.

The first concerns Urban Recreation and is provided for by:

- 1 Local Parks,
- 2 District Parks,
- 3 Children's Parks.

These are within walking distance of the population they serve.

The second concerns Area Wide Recreation which is provided in six types of area:

- 1 Predominantly Agriculture: areas of limited access,
- 2 Predominantly Moorland: areas of less limited access,
- 3 County Parks: areas of unlimited access,
- 4 Recreational Routes,
- 5 Natural Areas,
- 6 Special Use Areas.

In the main these are served by public and private transport, but interlinked by pedestrian walkways. They provide facilities for the whole of the Area.

In the case of Urban Recreation, space standards have been evolved for their planning, but in the case of Area Wide Recreation it has been impossible, except in the case of golf, to lay down space standards. The reason for this will be explained in their description, but will also bring out the need for a research project to study their 'carrying capacity' in land use terms.

Urban Recreation

1 Local Parks

In general, a Local Park should provide for a population served by a primary school or a population of about 2,500. The park, like the primary school, should be within walking distance of the homes it serves, or within a maximum of half a mile. The provision of facilities in a Local Park will depend upon the special role of the park in that specific community. It should be planned to allow for possible changes in the age structure and social habits of the community. This means that if the community is of an older age group, more space in the park should be given to quiet restful areas; if the majority age group is younger, then more space should be given to their requirements.

A Local Park should fulfil the requirements of all the community it serves.

Good landscape design and management, together with a sympathetic recognition of community needs, is the prerequisite of success for a Local Park.

Subject to the points previously made about 'flexibility', the park or group of closely related parks should be integrated into the community pedestrian-way system and provide the minimum facilities:-

2 grass pitches (4.50 acres),	}	with flood lighting.
1 junior all-weather pitch (1.75 acres),		
1 six risk bowling green (0.75 acre),		
3 tennis courts (0.50 acre),		
and lawns, etc., (3.50 acres),		

This gives a total of eleven acres of facilities for a population of 2,500.

Allowance may be made in a composite local park for children's areas. This aspect is dealt with later, under Children's Parks.

2 District Parks

In general, a district is an area normally served by a secondary school or a population of about 10,000. The District Park should be planned to cater for all age groups, providing outdoor and indoor facilities to meet a wide range of recreation and leisure interests.

Among the facilities at the park could be fields and courts for various sports, sports hall, community centre for arts, crafts, club and social facilities, children's play areas and a crèche which would allow parents to partake in a leisure activity.

Unlike the Local Park, every endeavour should be made to group the facilities of a District Park into one.

The following would be able to use the facilities: schools, sporting clubs, amateur groups and individuals interested in an activity which the park provides.

The location of the park should be integrated with the pedestrian-way system of the community it serves, but the following should guide the choice of location:-

- a The further the park is removed from the centre of the community it serves, the less effective it will be.
- b The sports hall, community centre and youth club could be considered as one complex in the area devoted to recreation. But if, in order to place the indoor facilities near an outdoor playing field area, it would mean taking the building a considerable distance from the concentration of population, then the choice should be to locate the indoor facilities close to the urban centre.

The following should guide the facilities to be sited in a District Park, and indicate the space requirements:-

4 senior all-weather pitches (8.00 acres) with floodlighting;
2 grass pitches (4.50 acres), cricket table (0.25 acres),
athletics track (0.75 acres), and 3 tennis courts (0.50 acres),
with floodlighting; and Sports/Community Hall with car-parking
(1.00 acres); i.e. basic space requirements of 16 acres,
not allowing for wastage.

The Committee recommend the use of all-weather pitches in both District and Local Parks.

The main reason for recommending all-weather playing surfaces is to reduce maintenance: The Area is characterised by clay sub-soil and subsequent flooding, which makes existing pitches unusable for many days per year.

There are two basic types of all-weather surfaces for games and sports:-

a the cinder type,

b the rubber type.

a The cinder type surfaces in use in Great Britain have proved quite successful as all-weather surfaces for the following reasons: the surface will withstand a great deal of hard and continuous use over a period of time; pitches are usable under most of the adverse weather conditions, and they require less maintenance than ordinary grass surfaces.

b At present there are only experimental examples of the rubber type surface in use in Great Britain. There are, however, a large number of rubber surfaces in use in the United States of America and in Europe. They have proved more successful than the cinder type, because they will withstand hard and continuous wear for very long periods more successfully than the cinder type; maintenance is virtually nil; line markings for play may be painted on as a permanent fixture if required; gravel rash from falls is avoided, and changes from one game to another, e.g. football to tennis, can be effected in a matter of minutes since there is no repair or maintenance required before the change is made.

All-weather surfaces are an advantage over grass for the following reasons:-

Adverse weather conditions do not affect play. The rubber type surface, for example, will withstand thirty degrees of frost and since the surface is porous, it will not lift with frost. The hazard of mud is obviously non-existent and heavy downpours of rain will not render the surface unusable. This in fact means that these surfaces can be used all the year round. Although all-weather surfaces are more expensive to lay than grass surfaces, in view of the vastly increased use and low maintenance costs, they are less expensive than they first appear. It is strongly recommended that flood-lighting be established, thus considerably increasing their effective use.

The following are some of the main activities that can take place on the same all-weather surface: association football, athletics, hockey, tennis, basketball, netball. The one game which can be played on grass only is rugby football.

As has already been indicated, fewer all-weather pitches are required to cater for the same volume of sport; for example, one all-weather area with flood-lights is equivalent to more than six grass areas of the same size (1). It should be noted that the 'standard' of provision in Local and District Parks includes all-weather pitches, but if these recommendations for their inclusion are not accepted, then the 'Space Standards' recommended in the Report can no longer apply.

The District Sports Hall should be capable of providing indoor facilities for practice and competition in as many sporting and recreational activities as possible, for example: association football, athletics, archery, badminton, basket ball, bowls, boxing, canoeing, climbing, cricket, cycling, golf, hockey, netball, roller-skating, rowing, shooting, dry ski-ing, squash, swimming, tennis, volley-ball, weight-lifting, trampoline.

Such a range of physical recreational opportunities can be administered and accommodated in the following:-

Hall:	120 feet x 70 feet.
3 rooms:	24 feet x 40 feet x 20 feet high.
1 room:	120 feet x 30 feet.

Swimming room, containing two tanks -

- a 25 yards x 25 feet x 4 feet deep.
- b 20 feet x 20 feet x 16 feet deep. (Diving pool)

Changing and apparatus storage accommodation.

The Sports Hall could be associated with further facilities of the Community Hall nature, and should include a small refreshment room. Swimming facilities have been recommended at each District Sports Hall, but one major swimming complex of Olympic dimensions should be provided to serve the total population of the Region.

Swimming is more popular now than ever before, and it is one sport which can claim family participation and which can accommodate a wide range of persons, from those keen on very active and competitive physical recreation to those seeking relaxation.

The Committee recommend that a swimming tank situated in a room alongside the Sports Hall would serve the needs of the casual bather or the learner, the accomplished swimmer or the devotee training for international events. The provision of a separate diving tank would ensure a greater degree of safety and that the area of water provided was being used to the maximum advantage over a greater period of time.

If the District Park is to fully exploit its potential, it must be managed (2) in such a way as to provide the maximum possible service to the community. It is not enough to provide good facilities; experience has shown that unless they are well administered, they make little impact.

The facilities should be open during the day and the evening. Peak use will be at week-ends and on week-day evenings when individuals and clubs will expect to be able to use the facilities. At other times during the day, use will come mainly from individuals, shiftworkers, women's clubs (hence the crèche) and schools where indoor sports facilities are not available.

It will consequently seem vital that such a recreational complex should be controlled by a Director (or 'Warden' or 'Sports Officer') who has been professionally trained to recognise the important and increasing role of recreation and sport in society. Whilst it is envisaged that he will be assisted and advised from above and below by knowledgeable and enthusiastic amateurs, he should be a person who, by his training and sense of vocation, should be capable of taking an objective view of the whole community and the recreational activities of its population.

If the facilities of this park are sponsored by a Local Authority, it could either be administered by the Authority or be leased at a nominal rent to a trust or committee representative of local sports bodies, who would then be responsible for day to day running and finance. The latter method has many advantages.

There is potential earning capacity from the provision of such sporting facilities grouped in a park. It is derived mainly from the introduction of members' subscriptions, bookings by clubs and other bodies, catering rights, spectator events, fees for coaching courses and sales of equipment.

3 Children's Parks

Children's parks are areas planned for imaginative, creative

and sometimes vigorous outdoor play of school children. These parks supplement the house by providing experiences not possible at home, create a focus for the children, and help in their development as social beings.

The parks should be integrated with the residential areas, free from traffic hazards, readily accessible to mothers and children, and should be sited so as to afford casual visual supervision.

It may be considered desirable that different age groups of children should have separate playgrounds or separate enclosures in a playpark (3). It is undesirable to draw hard and fast divisions at various ages and state categorically that a child's interest will change and develop from the nursery stage to the infant's as soon as he has reached the age of five. In reality, children develop at different rates and older children may wish to accompany their younger brothers and sisters into playgrounds which have been assigned to the younger age groups.

It is desirable that the playspaces and playparks should be designed to induce imaginative play and make-believe, and that mechanical equipment should be kept to the minimum.

Children's areas may well be sited within Local and District Parks, but accessibility and casual visual supervision is the main factor in their location.

The small 'incidental spaces' produced by areas unsuitable for houses because of physical characteristics, and retained or developed tree clusters provide the ideal setting for the younger (0-5) age group, who could be provided with climbing blocks, etc.

It is the 5-10 age group that requires swings, climbing frames, etc., and maybe a small paddling-boating pond. This age group generates more noise and this should be considered when their facilities are to be sited in the Local Park.

The 10-15 age group facilities should be sited among such physical site irregularities as will provide opportunities for constructive play. There should be space for team play. Again, the local park may provide the setting for their facilities.

The so-called 'junk' playgrounds seem more enjoyable to children than the standard 'fitted' playgrounds. They are, by their nature, inexpensive both to install and maintain, and would be a valuable addition to the children's park system. But 'junk' playgrounds can be unsightly to the sensitive adult and should be suitably screened and landscaped.

The following sum of 4 acres should be a guide to the 'space standards' for the children's parks for a population of 2,500.

0-5 age group,	5 areas of 0.2 acres (1.0 acre).
5-10 age group,	5 areas of 0.5 acres (2.5 acres).
10-15 age group,	1 area of 0.5 acres (0.5 acre).

Area Wide Recreation

The 'countryside' is characterised by the fairly fertile Bathgate Hills, Almond Valley, foothills of the Pentlands, and the uplands of the higher reaches of the Pentlands and Fauldhouse Moors. Disposed within these areas are the basic elements for recreation; rivers, reservoirs, canals, woodlands, spent shale bings, disused railways, small country roads, footpaths, hill tops and historic sites.

The Committee recommend the designation of this area as:-

- 1 Predominantly Agriculture - areas of limited access,
- 2 Predominantly Moorland - areas of less limited access,
- 3 County parks - areas of unlimited access,
- 4 Recreational routes,
- 5 Natural Areas,
- 6 Special Use Areas.

1 Predominantly Agriculture

In general, these areas are the Bathgate Hills, Almond Valley and the foothills of the Pentlands. They are in agricultural use at present; they should be encouraged to remain so, and the quality of the land improved. Limited access should be by recreational routes passing through the areas.

2 Predominantly Moorland

In general, these areas are the Uplands of the Pentland Hills and the Fauldhouse Moors. They would provide for walkers, orienteers and pony trekkers, whose activities could be made compatible with hill farming, forestry and water catchment.

3 County Parks

They should be large intensive use recreation areas which would vary in type.

- a Cobbinshaw Reservoir - an upland reservoir of over three hundred acres.
- b Harperrig Reservoir - a smaller reservoir than Cobbinshaw.

The shores of the reservoirs could provide for camping, adventure training and nature centres. Facilities should be considered for tourists interested in sailing, canoe-training, fishing and other water sports. Both these areas are at present very exposed. They offer resources for recreation but could not be brought into use until after a period of afforestation for shelter.

- c Seafield/Easter Inch Moss area.
- d Broxburn/Niddry Spent Shale Bing area.

These are two areas of industrial dereliction which could provide the material and sites for intensive recreational use.

- e A linear County Park in the Bathgate Hills from The Knock, Puir Wife's Brae, and linking through to Seafield Park. It is considered as a scale of park between the traditional 'city' park and a 'national' park. It could be thought of as a park appertaining to a City Region.

4 Recreational Routes

The recreational routes should be formed along rivers, the Union Canal, bridle paths, rights of way, disused railway routes, and the country road network. These routes would link urban and 'area wide' recreation facilities to each other and to the residential and other urban land use areas, forming the interlinked framework of a total recreation system.

At places where the country roads intersect with the walkways

of rivers and footpaths, facilities for car parking and picnicking should be sited.

These routes would be in the County Park areas, and clearly marked as rights of way when crossing areas of agricultural use.

5 Natural Areas

Where components of natural communities still exist, they are in fragments scattered throughout the Area, in riversides, marshes, hedgerows, road verges, waste ground, old quarries and disused railway embankments.

There are no 'Nature Reserves' nor any 'Sites of Special Scientific Interest'. Because truly wild areas no longer exist, landowners, both public and private, will need to manage the remaining semi-natural fragments to conserve their wild life potential as a background for recreation.

There is, however, a danger in setting down in a published report the location of these areas of particular interest to naturalists. Publicity would be detrimental to the continued existence of the rarer species of plant and wild life. The life of these species is precarious and it would appear that the exact and detailed location of the habitat of such forms of life must be left to those who have the most interest in preserving their secrets.

The location of these areas is known by the physical planners, and account is taken of the effect upon such areas in the siting of urban development (see Map 3.2).

6 Special Use Areas

These are facilities serving a community greater than the Area, and should provide space for single activities or closely related activities.

Among the special use facilities at present in the Area are the Royal Highland Showground and East of Scotland Go-Kart Club, Ingliston; proposed Scottish Motor Racing Circuit, Polkemmet, and Dog Racing at Armadale.

The Committee recommend that a Regional Sports Centre and Swimming Pool be developed. They should both be of Olympic standards and provide the highest calibre of facilities for instruction, training and administration. They should be capable of catering for international events in addition to major local competitions, and supplement the facilities recommended for the District Park.

Golf should be considered in the 'Special Use Areas' and should be on the basis of one eighteen hole course to every 16,000 of population. This does not necessarily mean that population growth in the Area will call for an additional six or seven courses. The future provision should be based on an assessment of population growth and dispersal in the Edinburgh, Mid, East and West Lothian area and numbers and locations of courses should be determined accordingly. To achieve a more even balance and to reduce travelling and traffic on the roads, more courses will be needed to the west of Edinburgh than would be indicated by a simple calculation of population growth in the Area.

SUMMARY

Survey

This Chapter is based on the Report of the Special Committee on Recreation.

The Survey Area can be divided into the five following recreational landscape types, each of which is suited to particular recreational activities:- Natural Areas, for biological study; Moorlands, for hill walking, shooting and fishing; Agricultural Land, for occasional camping and walking; Industrial Dereliction, at present of very limited use, but with a great potential; and Urban Areas, for playgrounds, football, bowling, tennis, etc.

There are approximately two hundred and fifty acres of public recreational open space in the Survey Area.

Principles

Recreation requires three ingredients; individuals or groups; sufficient time to participate; and accommodation. Space standards are evolved from certain basic principles; these are accessibility, flexibility, eye-appeal, integration and carrying capacity.

Accessibility is the provision of all the necessary recreational facilities to make sure that all tastes and all age groups are provided for in such a way that they can take full advantage of the facilities offered.

Flexibility is the ability of the recreational space to adapt itself to new or different uses, as conditions and circumstances change.

Eye-appeal is incorporated in the initial design and maintained throughout the period of use, to attract people to the areas, and give them the maximum pleasure when they arrive.

Integration is the relationship which should exist between all the recreational facilities and the other social and essential services of the communities they serve.

Carrying capacity is the measurable ability of a landscape to absorb people and wear without either losing its essential character or being physically damaged beyond repair.

Proposals

The proposals fall into two main classes, Urban Recreation and Area Wide Recreation.

Urban Recreation

The provisions for urban recreation are of three types:-

- 1 Local Parks,
 - 2 District Parks,
 - 3 Children's Parks.
-
- 1 Local Parks (per 2,500 people)

These are provided for a population of about 2,500. A Local Park should be within walking distance of the homes it serves and should meet the specific needs of the whole community. The minimum facilities are:-

2 grass pitches	4.50 acres
1 all-weather pitch	2.25 (junior 1.75)
1 six-rink bowling green	0.75
3 tennis courts	0.50
lawns, etc.	3.00
	11.00 acres

2 District Parks (per 10,000 people)

These serve a population of about 10,000 and provide outdoor and indoor facilities to meet a wide range of recreation and leisure interests. The facilities should include: fields and courts for various sports, sports hall, community centre, and children's play areas. The park should be integrated with the pedestrian system. The facilities are:-

4 all-weather pitches	9.00 acres (2 junior, 2 senior)
2 grass pitches	4.50
cricket table	0.25
athletics track	0.75
3 tennis courts	0.50
sports hall with parking, etc.	1.00
	16.00 acres

3 Children's Parks (per 2,500 people)

These are scattered throughout the residential areas, free from traffic hazards and readily accessible to mothers and children. The different age groups should have separate enclosures.

0 - 5 age group (5 x 0.2 acres)	1.00 acres
5 - 10 age group (5 x 0.5 acres)	2.50
10 - 15 age group (1 x 0.5 acres)	0.50
	4.00 acres

Area Wide Recreation

Area Wide Recreation is provided for in:-

- 1 Predominantly Agricultural Areas: areas of limited access,
- 2 Predominantly Moorland Areas: areas of less limited access,
- 3 County Parks: areas of unlimited access,
- 4 Recreational Routes,
- 5 Natural Areas,
- 6 Special Use Areas.

- 1 Agricultural Areas: recreational routes should pass through them.
- 2 Moorland: access should be provided for walkers, pony trekkers, etc., with few restrictions on movement.
- 3 County Parks at Cobbinshaw and Harperrig Reservoirs should provide facilities for water sports, and centres for camping, adventure training, etc. The County Park at Bathgate and the areas of industrial dereliction at Seafield and Broxburn should be converted for intensive recreational uses.
- 4 Recreational Routes should be formed along river banks, the canal, disused railways, etc., forming a regional network.

- 5 Natural Areas: the old quarries, railway embankments, marshes, etc., should be preserved for the conservation and observation of wild life.
- 6 Special Use Areas: a Regional Sports Centre and Swimming Pool should be developed.

 Golf courses should be provided on the basis of one eighteen hole course to every 16,000 people in the Lothians and Edinburgh area.

REFERENCES

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2. Information extracted from an Interim Report by G. A. Perrin, A.R.I.B.A.; prepared for the National Playing Field Association who provided a two-year research fellowship for the study.
3. Information extracted from an unpublished report by Mr. H. F. Clark, P.P.I.L.A., Senior Lecturer in Landscape Architecture, University of Edinburgh.

Chapter 14. URBAN SETTLEMENTS

The Town Groups

INTRODUCTION

In Volume I, Part II, it has been said that "for the economist it is difficult to think of the settlements in the Region as independent for they are all a part of the economy of the same place". However, for the physical planner it is desirable to differentiate between settlements of varied function and character, and, therefore, for physical studies, the Region has been subdivided into twelve areas, termed Town Groups, centred on the principal settlements.

This Chapter gathers material relating to existing settlements in the Town Groups from preceding Chapters in Volumes I and II, and from the Development Plan documents for the two Counties. In some cases the material is supplemented by further detail; in all cases it is derived from sources listed in the main Chapters.

Survey information for each Town Group has been evaluated in relation to information obtained for the Region as a whole, and those factors of paramount importance which have emerged have been accepted as critical criteria in considering proposals for the particular Town Group. The factors are summarised and provide the background to the decisions taken for the development of each Town Group.

Before proposals could be formulated certain principles had to be established for the improvement of the existing urban environment, and for the creation of new identity for the expanded Groups. Environmental quality varies in the Region. Some improvement will result from the rehabilitation programme designed to erase the dereliction arising from extractive industries, and from the channelling of through traffic on to new national and regional roads; but within the towns the conflict between accessibility and environment will increase as motor traffic increases, and the regional improvements will be cancelled out locally unless further steps are taken to anticipate events within the towns. Principles evolved in the Buchanan Report, 'Traffic in Towns', for securing safe and pleasant surroundings are already accepted as fundamental to any improvement. These principles have been the basis of the proposals, and are briefly outlined here.

The road hierarchy is resolved at the outset. For purposes of regional and urban design, roads may be classified as national; regional and area distributors; primary, district and local town distributors; and service roads. The first two categories have been discussed in Chapter 12, and it is the town distributors and service roads which mainly concern the designer within the urban settlements.

Theoretically, access roads connect only to local distributors, local distributors to district distributors and so on, but this may be impossible to achieve in areas of existing development, and duplication will occur in small towns. With some exceptions, buildings are sited in association with service roads and are set back from other roads to alleviate disturbance from noise and traffic.

Environmental areas, neighbourhoods, or precincts are defined by placing distributor roads on the perimeters with access from service loops or culs-de-sac. Environmental areas are not cut through by traffic, and pedestrians move in safety, living and working in areas free from vehicular noise. The size of any such area depends on the traffic generation potential, and the capacity of the surrounding

road network, and is influenced by existing development, topography, and orientation. Where free pedestrian movement cannot be achieved in the environmental area by imaginative use of levels, Radburn principles are applied at ground level. Convenient and safe routes to schools, shops, open spaces and bus stops are essential features.

To prevent service roads from being used for parking, adequate garage accommodation and off-street parking space are necessary. This suggests provision in residential areas of at least one garage or parking space per dwelling with one further space per two dwellings for visitors' parking and trade deliveries. Existing development is seriously under-provided, and parking must be incorporated to avoid premature obsolescence of many areas built only a few years ago.

The visual impact of environmental areas is considerable where roads and buildings are designed together. Buildings are then related to roads in terms of distance and access, according to function, and landscaping is an integral part of the layout. The whole gives a sense of place and visual satisfaction. Separation of vehicles and pedestrians does offer a whole series of visual experiences derived from changes of scale. Thus the higher the road in the hierarchy, the larger is the scale of landscaping. Service roads, for example, are closely related to buildings served, to parking areas, turning spaces and garage groupings; and distributor roads provide impressions of a town by occasional glimpses of its inner core. Movement on the pedestrian ways is relatively slow and, therefore, more static vistas are of greater importance. All the parts contribute to a recognisably continuous whole, wherein footpaths from shops to houses lead to local open space and to more distant walking routes on a clearly defined circulation system complementary to the vehicular circulation system.

Implementation will be a gradual process. The fullest realisation of the principles outlined will occur in the New Town, where large areas of development can be designed as a whole. Elsewhere in the Region settlements have in the past grown sporadically. In these cases considerable improvements are possible by closing streets, providing playgrounds and parking space, and planting trees. Such schemes may involve demolition of some houses and cost is likely to be high. However, the demand for this form of improvement will increase as deteriorating conditions due to increased traffic come to be compared with conditions in new schemes employing the principles described here.

The Consultants have had in mind these broad principles in considering proposals for development in the Town Groups. The principles should be applied to all areas, whether primarily industrial, residential or commercial, if a real improvement in the environment for living is to be achieved in the Region.

Planning proposals resulting from the application of these principles are illustrated by the Advisory Master Plan, by Advisory Plans for the principal settlements in the Town Groups, and by broad descriptions in the text. Detailed explanations of principles and standards embodied in proposals for various land uses such as education, and public open space, are given in the relevant Chapters, and the bringing up to standard of provision in existing areas for such uses is implicit in the proposals.

The Town Groups are studied individually under 'Survey', 'Summary of Planning Factors', and 'Proposals', and the sequence relative to the Advisory Master Plan is clockwise, commencing with Mid and East Calder at the south-east fringe of the Survey Area. The Chapter ends with a summary of the survey and proposals for all the Groups.

Location

The Town Group area containing the villages of East Calder and Midcalder extends from the south-east boundary of the Lothians Regional Survey Area to the eastern fringe of the designated area of Livingston New Town, and includes several additional small settlements.

General Description

Two streams, the Linhouse and Marieston Waters, flow north-eastwards to join the River Almond, creating a barrier between the Calder villages. Both East Calder and Midcalder are historic settlements. East Calder is the more linear in form and contains the ruins of a twelfth century church. Midcalder has several buildings included in the Scottish Development Department's 'List of Buildings of Architectural or Historic Interest', and these contribute to its pleasant rural atmosphere. There are a number of estates in the vicinity, although some have been curtailed and others sold. Kirknewton, south-east of the Calder villages, was also quiet and rural until the establishment of an air station for the use of the United States Air Force brought new activity. Pumphreston and Oakbank are both small settlements based on oil shale refineries north and south of the Calders. Oakbank refinery closed in 1932 and Pumphreston is still engaged on manufacture of detergent, but this is no longer derived from local oil shale. There are extensive bings close to both settlements.

Communications

The Calder villages lie on the Edinburgh-Kilmarnock road, A71, about eleven miles west of Edinburgh. From Midcalder A767 runs north through Pumphreston and crosses A8 to reach Uphall. A705 leaves Midcalder for Livingston, Blackburn and Whitburn. Kirknewton lies on B7031 which leaves A71 east of East Calder and runs south to connect with A70, Edinburgh-Lanark.

The bus service in this sector is reasonably good. Occasional buses leave A71 to make the detour to Kirknewton; others continue from the Calders to Livingston village, Blackburn and Whitburn. Additional buses are available hourly to Bathgate via West Calder, and to Uphall and Broxburn via Pumphreston.

The Edinburgh-Glasgow via Holytown railway passes to the north of Kirknewton and well south of the Calder villages. Midcalder station is very close to Kirknewton and still has a passenger service. This is scheduled for early withdrawal in the British Railways modernisation plan, as are all the stations on the line in the Survey Area.

Population and Housing

The total population of the Town Group in 1961 was approximately 5,900, of whom well over 1,000 lived at Kirknewton. Some housebuilding has been carried out in the post-war period and several infilling schemes have been completed recently. Oakbank miners' rows are largely sub-standard and about a hundred houses in the Town Group can be expected to fall below acceptable standards over the next twenty years. Both Midcalder and East Calder contain some older houses which are in private ownership and well cared for.

Industry and Employment

There is still a certain amount of agricultural employment in dairying and in pig and poultry rearing. The Forestry Commission has a Unit at Kirknewton employing a number of men. One stone

quarry is in production just outside the Survey Area. A small mill produces wall board and chipboard on a site by the River Almond. Parts of the chemical works and brick works at Pumpherston are still in production.

Community Facilities.

Shopping. The shopping facilities in the Calder villages, Kirknewton and Pumpherston mainly consist of general and food stores. Oakbank has two small stores.

Education. Primary schooling is available in all the settlements. Roman Catholic primary schooling is at East Calder. East Calder has a junior secondary school. Special schooling is available at Midcalder.

Recreation. Public open space is not extensive, but all these villages are close to fine countryside. The banks of the River Almond provide river walks. Private open space includes a golf course near Kirknewton at Dalmahoy, outside the Survey Area. A putting green has been opened in East Calder public park, to supplement existing facilities. The villages have a range of church, village and masonic halls used by local societies.

Utility Services

Water is supplied by Edinburgh Corporation.

Gas is not available to these villages.

Electricity is supplied by the South of Scotland Electricity Board.

Sewerage is treated by a modern works supplemented by a Dano Composting Plant which may be combined with a major works serving Livingston New Town.

SUMMARY OF PLANNING FACTORS

The peaceful character of Midcalder and East Calder, two rural villages in wooded surroundings, is threatened by through traffic on A71.

There is a demand in this part of the Region for middle-income housing. Since utility services are adequate for an increased population, sites considered suitable could be released for residential development at an early date.

Parts of the Calder villages will be less than half-a-mile from the Central Area of Livingston New Town. Good direct access to the spine road of the New Town would be possible via the existing A71, if the through-route function of the road was discontinued.

Kirknewton, in a more isolated situation than the Calder villages, is partly dependent on the United States Air Force base for its continuing prosperity; Pumpherston, on the fringe of the New Town's designated area, is overshadowed by bings and chemical works; and Oakbank, a mining settlement, has outlived its purpose.

PROPOSALS

Immigrants should be encouraged to the Calder villages to achieve a target population of 15,000 by 1985. The increased population should have ready access to Livingston Central Area, and to the industrial estates proposed at Murieston and Pumpherston (see Chapter 9). Since the Town Group can satisfy the town dwellers' desire for a semi-rural environment, middle-income groups are likely to be amongst the immigrants attracted to sites in these villages. The environs of Kirknewton should also be regarded as a potential area of expansion for middle-income housing on a small scale.

The A71 should be re-routed to free the Calder villages from through traffic, and to enable the centre of Midcalder to be redeveloped as a

pedestrian precinct incorporating some historic buildings. The new A71 should cut through Oakbank bing area where reshaping and rehabilitation should be carried out in phase with the road works. The existing A71 should be used to provide access to the Livingston road system.

In the system of walkways proposed for the Region (see Chapter 13), three routes meet at the confluence of the Almond and the Linhouse and Murieston Waters. The meeting of the waters should be enlarged to form a lake on the land which is at present liable to flood. This would create a focal point for recreational pursuits in the vicinity.

Proposals for Mid and East Calder are shown on Plan 14.1.

Location

The Town Group comprises the settlements of West Calder and Polbeth situated on land lying between the valleys of the Harwood Water and West Calder Burn, two streams flowing north-east to the River Almond. Also included in the Town Group is a row of miners' cottages at Mossend, north of West Calder. Polbeth and West Calder are at present separated by undeveloped land.

General Description

Ivy-clad ruins of the old kirk founded in 1643 and cottages by the Kirkgate are indications of West Calder's historic associations. Coal was dug at West Calder in the eighteenth century and shale mined in the nineteenth century, causing poorly drained land punctuated with hings to the north, in contrast with the mature landscape of farms and estates to the south. Subsidence round West Calder prevented the expansion of the town and led to the rapid post-war growth of Polbeth on unaffected land.

Communications

A71, the road from Edinburgh to Kilmarnock, traverses Polbeth through an avenue of trees, service roads being provided for the adjacent housing. The road continues west to become the congested main street of West Calder before reaching open moorland. B792 runs north to Bathgate from West Calder and B7008 south to join A70, Edinburgh - Lanark.

Buses connect with the Glasgow-Whithorn-Midcalder-Edinburgh service, and some three hundred passengers travel to Edinburgh at peak hours. The Edinburgh-Glasgow via Holytown railway line skirts the south of Polbeth and north of West Calder. The passenger station at West Calder is still in use, although it is scheduled for early withdrawal in the British Railways modernisation plan.

Population and Housing

The 1961 census population of 4,700 contained a higher percentage in the older age groups than that of the Survey Area as a whole. Recent housing development has occurred in Polbeth and plans have been prepared for urban renewal in West Calder and for substantial residential expansion at Parkhead. There are still some temporary dwellings in the Town Group and these along with properties falling below acceptable standards will require to be replaced by approximately two hundred new dwellings over the next twenty years.

Industry and Employment

West Calder is a centre for food products marketed by the local Co-operative Society. The surrounding area offers employment in agriculture and construction, but the level of unemployment is still fairly high in spite of the job opportunities now available at Livingston New Town. An Advance Factory is being developed on land between West Calder and Polbeth.

Community Facilities

Shopping. West Calder's shops are mainly in old properties on the main street. A new block, the first part of an urban renewal scheme, has recently been completed. Polbeth has some shops in the housing areas on both sides of the A71 and some temporary shops which will gradually be replaced. The shops in the Town Group centred on West Calder are largely devoted to food and household items.

Education. A new secondary school is under construction at Polbeth and a new Roman Catholic primary school is being built at West Calder. Roman Catholic secondary pupils will travel to Midcalder when the existing primary and junior secondary school is demolished.

Recreation. Limefield Park, Polbeth, provides pitches, play space, sitting space, bowling green and tennis courts in park surroundings, as well as a footpath on the wooded banks of the Harwood Water. This is a splendid open space often used by visitors in the summer for Sunday School picnics and other club outings. Local open space in West Calder is, however, deficient but some use is made of open land to the north of the railway. There are proposals for a youth centre and a gymnasium to supplement existing indoor facilities, which include a cinema and halls.

Utility Services

Water is supplied by Edinburgh Corporation.

Gas is supplied from the governor station at Armadale to West Calder. Polbeth has no gas supply.

Electricity is supplied by South of Scotland Electricity Board via the grid-substation at Bathgate.

Sewerage is inadequate, but future needs will be met by the Breich Water Sewerage Scheme, which will also serve Livingston New Town.

SUMMARY OF PLANNING FACTORS

Traffic using A71 affects the amenity of the two principal settlements in this Town Group, West Calder and Polbeth. Congestion is severe in West Calder, the older settlement, and considerable redevelopment is needed.

Development has been inhibited by the danger of subsidence; but shale mining has now ceased, and it is possible to build in the vicinity of West Calder, subject to detailed investigation of sites and the observance of precautionary measures in design and construction of buildings.

Residents of the Town Group will have ready access to the Central Area of Livingston New Town, and to industrial sites at Murieston and Addiewell, when through traffic ceases to use the existing A71.

There are a number of unsightly areas in the vicinity, in particular the vast bing by the West Calder Burn. Subsidence has destroyed the natural drainage of land to the north of Polbeth.

PROPOSALS

A71 should be re-routed to relieve Polbeth and West Calder of through traffic. The existing A71 should then serve as a district distributor road (see Plan 14.2).

The Town Group should be planned to accommodate a population of 13,000 by 1985. Phased development of a pedestrian shopping precinct at West Calder, and the provision of additional community services elsewhere, should be based on this population target.

The area north of West Calder, embracing the remnants of the mining village of Mossend, should be reserved for residential development beyond 1985, by which time rehabilitation of the areas of industrial dereliction should have contributed to improvement of the environment.

Location

Lying north and south of the Breich Water some six and a half miles south-west of Midcalder and eighteen miles from Edinburgh, are Bents, Garden City and Stoneyburn in West Lothian, and Loganlea, Addiebrowhill and old Addiewell in Midlothian. Also included in this Town Group is Breich, a small settlement on A71.

General Description

Addiewell was based on oil shale works and Stoneyburn and Loganlea on collieries. Bents dates from early in this century and Addiebrowhill rather later.

The steep valley of the Breich Water separates the two groups of settlements from one another.

Large bings north and south of the valley are prominent features. An even larger spent-shale bing east of Addiewell is being quarried by contractors for materials for road construction, but the slopes are too steep to support vegetation, and progress on removal of the bing is very slow, emphasising the need for major rehabilitation.

Communications

The Edinburgh-Kilmarnock-Irvine road, A71, runs through open moorland to the south. B7015, Midcalder-Fauldhouse, forms the main street of Stoneyburn and Bents, while B792, West Calder-Blackburn-Bathgate-Torphichen, provides the valley crossing to the east of old Addiewell. Two viaducts carrying disused mineral railway tracks and a footbridge provide pedestrian links across the valley.

Buses from Bathgate to West Calder serve Addiewell and, at less frequent intervals, Stoneyburn and Bents. There is an Edinburgh-Loganlea route but this is not always a direct service, changes being necessary at West Calder and Midcalder and sometimes at both. Breich has a very limited service to Bathgate.

The Edinburgh-Glasgow railway line via Holytown runs to the south of the main group of settlements and the passenger stations at Addiewell and Breich are still in use.

Population and Housing

In 1961 the Town Group's population of over 4,700 included a higher percentage of males than the population of the Survey Area.

Apart from a two-storey group at Addiewell, almost all miners' rows have been replaced by Local Authority and S.S.H.A. houses. Nearly one hundred and fifty dwellings are expected to fall below acceptable standards in the period up to 1985.

Industry and Employment

The mines at Loganlea closed recently and there is some travel to work in Whitburn and other mining areas. The manufacture of spun concrete pipes is starting on the site of the former Addiewell retort works and is expected to employ between two hundred and fifty and four hundred workers. South of Addiebrowhill and east of the junction with A71 a bonded warehouse has recently been completed. Some agricultural employment is available in the area, but opportunities for women are extremely limited in this Town Group.

Community Facilities

Shopping. Most shops in the Town Group are on the main street at Stoneyburn, although additional general stores are situated at Loganlea, Addiewell and Breich. The dispersed nature of the

communities has discouraged development of a main centre. Bathgate is the regional shopping centre.

Education. Addiewell and Stoneyburn have separate schools but the primary and Roman Catholic schools at Addiewell are isolated from the newer housing. Breich also has a small primary school.

Recreation. There are facilities for football, bowls, tennis and children's play. The existing valley of the Breich Water is used for recreation but unfortunately the amenities of this area are affected by three sewage works in the valley.

There are a number of licensed clubs. Dances and cinema shows are held at the Miners' Welfare Institute. The Town Group suffers from a lack of purpose-built accommodation for youth activities.

Utility Services

Water is supplied by the West Lothian Water Board and Edinburgh Corporation.

Gas is available from the old distribution system which is overloaded.

Electricity is supplied by the South of Scotland Electricity Board. A power line passes overhead to the east of Addiebrownhill.

Sewerage is unsatisfactory. The plants are too close to residential areas and spoil the potentially attractive open space. A joint Breich Water Sewerage Scheme is projected and should overcome present difficulties.

SUMMARY OF PLANNING FACTORS

The communities are scattered on either side of the valley of the Breich Water, and situated in both Midlothian and West Lothian. Some of the facilities which one would expect to find serving a population of this size are absent, and others are duplicated.

In common with other settlements in the Region formerly dependent on extractive industries, Addiewell has areas of industrial dereliction, and needs fresh sources of employment.

Sites overlooking the Breich Valley are potentially attractive for housing, but the three sewage disposal plants in the valley require replacement by a joint scheme away from the residential areas. Such a scheme is projected.

The Town Group is exposed to severe prevailing winds.

PROPOSALS

Administrative boundaries should not preclude the integration of the settlements into one community. A new north/south length of road should be built east of Loganlea Bing to link the neighbourhoods and a new shopping centre at Stoneyburn, south of B7015. Further development north of B7015 should be discouraged.

The potential of the valley as open space of high quality should be realised by early programming of the Breich Water Sewerage Scheme. Further steps to improve the urban environment should include rehabilitation of areas of industrial dereliction, and a substantial tree planting programme.

No additional development should occur at Breich; any unsatisfactory housing should be replaced in the main settlement where a building programme, designed to bring the total population of the Town Group to 8,000 by 1985, is recommended.

An improvement of the bus service is desirable to widen the opportunities of employment, particularly on closure of the railway station.

Proposals for Addiewell are shown on Plan 14.3.

Location

Fauldhouse Town Group comprises the village of Fauldhouse in a marginal land setting. The village is in an exposed situation on the south-west fringe of the Region seven hundred and fifty feet above sea level. Shotts lies five miles westwards, and beyond are the industrial areas of Lanarkshire. Edinburgh is twenty miles to the north-east.

General Description

Moorland, scarred with fireclay mines, open-cast quarries, and disused mineral workings, surrounds Fauldhouse which is made up of mining and quarrying communities which have grown together. Records state that "Tall chimneys were to be seen in all directions in the mid nineteenth century". Considerable rehabilitation has already been carried out in the Town Group although much still remains to be done. Rainfall is around forty inches per annum and strong north and north-east winds are experienced in spring and early summer.

Communications

The Shotts-Longridge road, B7010, and B7015, Midcalder-Stoneyburn-Fauldhouse-Shotts, meet at the centre of Fauldhouse.

A half-hourly bus service links Fauldhouse to Shotts, and to Bathgate via Whitburn.

The Edinburgh-Glasgow via Holytown railway line crosses Fauldhouse golfcourse to reach a station west of the built-up area.

Population and Housing

The 1961 census figure of 5,200 showed a higher percentage of young people than the population of the Survey Area as a whole. House building by the County Council and S.S.H.A. has helped to prevent the population from declining as might otherwise have been expected on the closure of the pits.

Present development has been influenced by the presence of bings and quarries. However, considerable rehabilitation is in progress and some unsightly areas are being reclaimed for housing near the centre. Over two hundred dwellings are expected to fall below acceptable standards over the next twenty years.

Industry and Employment

Fireclay, sandstone and peat are still worked near Fauldhouse and many miners travel to other parts of the county to work. The Forestry Commission has begun work on a plantation to the north of the village, and a few people are employed in the Scottish Home Department store. There is some service employment, but additional sources of employment are needed.

Community Facilities

Shopping. Shops are sited round the junction of the Longridge-Shotts roads. Food shops and general stores predominate but additional services include a Post Office, Bank and several cafes. Bathgate is visited for shopping from this part of the Region, and Glasgow is favoured more than Edinburgh for occasional shopping trips.

Education. Schooling is available to junior secondary standard, but senior secondary pupils have to travel to Bathgate. The Roman Catholic school on the main street is in very cramped

premises and a temporary classroom has recently been added.

Recreation. Fauldhouse is comparatively well provided with facilities for active recreation. The golf course, cricket ground, football ground, bowling green and school playing fields are all well patronised. Disused railway lines are used as footpaths and could be greatly enhanced by judicious tree planting. All open space would benefit from additional screening and shelterbelts in this exposed situation.

Possibly because of its comparative isolation Fauldhouse is a flourishing community. The former cinema is used as a bingo hall and social club and there are numerous local societies. A library was opened recently.

Utility Services

Water is supplied by the West Lothian Water Board.

Gas is supplied from storage in Fauldhouse.

Electricity is supplied by the South of Scotland Electricity Board.

Sewerage is adequate for six thousand persons. The Breich Water works was recently reconstructed.

SUMMARY OF PLANNING FACTORS

Fauldhouse is an isolated community on very exposed high ground on the south-west fringe of the Region, nine miles from the centre of Livingston New Town.

The present quality of the urban environment is poor. Evidence of former dependence on extractive industries is obtrusively apparent, and, despite much recent housing development, the Town Group is depressing to the visitor.

Sewerage is of limited capacity.

Workable deposits of fireclay are still present to the south-east of Fauldhouse.

PROPOSALS

Sewerage in the Town Group has capacity for only 6,000 persons, and this has been accepted as a limitation to expansion. The figure should be achieved by restricting residential development to infilling, rounding-off and relocation of tenants displaced from unsatisfactory dwellings outside the built-up area.

Urban renewal in Fauldhouse should incorporate the realignment of the main street, improvement of local roads, and concentration of shopping to the south of B7010.

Rehabilitation should include further afforestation of the area to the north. The urban environment should be substantially improved by planting of shelterbelts and screens of trees near the town.

Bus services to Livingston should be planned for convenience of residents finding employment in the New Town.

Proposals for Fauldhouse are shown on Plan 14.4.

Location

The Town Group comprises Whitburn, East Whitburn, agricultural areas, part of the upper reaches of the River Almond, open moorland, and the village of Longridge. Whitburn is approximately midway between Edinburgh and Glasgow, and just south of A8 between five hundred and fifty and six hundred and fifty foot contours.

General Description

Whitburn was at one time a coaching station and had cottage weaving as its principal industry. Subsequently mining developed in the area and the town expanded further after the opening of Polkemmet Colliery in 1913.

Visually the approaches to Whitburn are good; coming from the south the town is seen from high ground as the road curves downhill to the centre; from the north it appears compact on gently rising ground; from Livingston to the east, the road is pleasantly wooded and provides good views to the north; from the west the town is screened by the trees of Polkemmet House.

A mile and a half to the south the church spire of Longridge punctuates the skyline and can be seen from many parts of the Region.

Communications

Whitburn is divided into quadrants by two roads, A705 and A706, which intersect at the centre of the town. A706, B^oness-Lanark, which carries heavy industrial traffic to the south, seriously affects the environmental quality of the town, creates congestion and is dangerous. East Whitburn, half a mile or so eastwards on A705, and Longridge, on A706 near the Fauldhouse road junction, are both roadside villages looking to Whitburn for many facilities. Buses serve Armadale, Bathgate, Edinburgh and Glasgow, and, less frequently, Longridge and Fauldhouse.

Population and Housing

The 1961 census population figure for the Town Group approached 7,500, of whom some 800 lived at East Whitburn and 200 at Longridge. In 1962 the Burgh of Whitburn signed an 'overspill' agreement with Glasgow Corporation and proceeded to build five hundred houses. This has contributed to a rapid increase in the population in recent years.

Over three-quarters of the houses in the Burgh of Whitburn are owned by the Local Authority and the S.S.H.A. Approximately two hundred dwellings, including prefabs, will fall short of acceptable standards in the next twenty years.

Industry and Employment

Much of the local employment is provided by the coal mines at Riddochhill, Whitrigg and Polkemmet. Polkemmet Colliery immediately south-west of Whitburn is causing problems of atmospheric pollution by smoke and dirt.

B. M. C. is another important source of employment outside the service field.

An industrial site is available beside the A8 in the north-west corner of the town and an Advance Factory has been completed and let to an electrical switchgear firm.

Community Facilities

Shopping. Shops are mainly confined to the main street near the Cross and serve convenience shopping needs. There is

however dependence on Bathgate for other shopping needs.

Education. There are two primary schools, one under construction, the other of post-war construction. A senior secondary school is also under construction and when completed local pupils will no longer have to travel to Bathgate. Roman Catholic pupils travel to Bathgate or Armadale.

Recreation. Provision of open space at Whitburn has been good but the expanding population will require additional open space. There are public football pitches, tennis courts and a running track, and a private bowling green and junior football ground with covered stand and enclosure.

Present facilities in Whitburn include a cinema, Miners' Welfare Institute, two Youth Clubs and a new Branch Library. A number of local societies and clubs are in existence and further information on this is to be found in Volume I, Chapter 17. In common with other places in the Region, Whitburn has an Entertainment's Committee which organise functions to raise money for the annual Children's Gala Day.

East Whitburn and Longridge are largely dependent on Bathgate, Whitburn and Fauldhouse for recreational purposes.

Utility Services

Water is supplied by the West Lothian Water Board.

Gas is supplied by the Scottish Gas Board from the governor station at Armadale.

Electricity is supplied by the South of Scotland Electricity Board.

Sewerage is in course of improvement. A new works has been built to serve a population of 10,000 and is capable of being increased to serve 20,000.

SUMMARY OF PLANNING FACTORS

The Burgh of Whitburn is the most westerly settlement on A705 before the A8/A705 junction, and development in the future will be physically restricted by the closeness of the crossing of A8 and the projected M8. At present the A8/A705 junction channels traffic through the congested main street. Traffic in a north/south direction also contributes to congestion.

There is a need for improved community facilities in the Town Group.

Fireclay mining rights exist east and west of the Burgh.

The banks of the River Almond and the White Burn have potential for open space uses.

PROPOSALS

The connection of A705 and A8, west of Whitburn, should be discontinued to prevent travellers to and from Livingston from using A705 as a through road. A706 should be realigned eastwards to avoid the centre of Whitburn; a connection to M8 should be provided north of the town.

Expansion of Whitburn will be physically limited on the east, west and north by roads and mining rights, and on the south by Polkemmet Colliery and the White Burn. East Whitburn will also be restricted by A706; and Longridge, the only other settlement, is in an isolated situation. A population of 10,000 in 1985 is therefore considered appropriate for the Town Group, and this should be achieved largely by infilling, rounding-off and redevelopment.

Renewal of Whitburn's centre to provide pedestrian and vehicular separation and improved community facilities should be undertaken in phase with the road works.

A special-use recreation area should be developed around Polkemmet House, west of Whitburn. Planning permission has already been granted for a motor-racing track in the grounds of the House, and this proposal could be incorporated in a scheme covering a larger area.

Proposals for Whitburn are shown on Plan 14.5.

Location

This Town Group west of Bathgate comprises the Burgh of Armadale, Bathville, some farms, and dispersed cottages.

General Description

In 1841 Armadale was only a moorside hamlet, but the development of industries associated with coal, iron and limestone deposits led to rapid growth in the later part of that century, and these industries continue to be the basic sources of employment.

The area is some five hundred and fifty feet above sea level and exposed to prevailing south-west winds.

Communications

The Bathgate-Armadale-Airdrie road, A89, and A706, Bo'ness-Lanark, cross at the town's centre, creating congestion and danger to pedestrians. Gradients on the north-south A706 are severe. Travelling east by A89 through Bathgate to A8, Edinburgh is some twenty miles distant; travelling west by A89 through Airdrie, Glasgow some twenty two miles.

Good bus services link Armadale to Bathgate, Edinburgh, Airdrie and Glasgow. Less frequent routes serve Bo'ness, Whitburn, Shotts and Falkirk.

The Bathgate-Airdrie line railway station near Bathville is used only for goods.

Population and Housing

Armadale and the contiguous landward area had a population of around 8,300 in 1961. The area had a smaller percentage of people aged sixty five and over than the Survey Area as a whole.

Although the majority of houses have been developed in recent years by the Local Authorities and the S.S.H.A., it is estimated that one hundred and thirty houses remain below acceptable standards. The Council is now proceeding with residential development in the north-east sector of the town.

Industry and Employment

Armadale manufactures steel castings, fireclay pipes and bricks, hosiery, confectionery and briquettes (see Volume I, Chapter 5). Large scale industries in the Bathville area contribute to the problem of atmospheric pollution. Additional employment is provided by the British Motor Corporation factory at Bathgate.

Much of the land around Armadale has been seriously affected by mining subsidence and disruption of natural drainage. The nearest working colliery is at Easton, Bathgate, and mining rights still exist to the north-east of the town.

Community Facilities

Shopping. Shops are concentrated at the junction of East and West Main Street, and North and South Street, and are fairly prosperous in spite of Bathgate's proximity.

Education. Armadale has one small primary school, one large and overcrowded primary and junior secondary school, and one Roman Catholic primary school. A senior secondary school is under construction. Senior secondary schooling is at present in Bathgate.

Recreation. The Burgh is short of playing fields and children's play areas. Private open space provides a cricket pitch and an amateur football ground. A greyhound stadium off the Bathgate road is well supported. Much of the existing open space is barren and in need of shelterbelt planting. Armadale's immediate surroundings are spoilt by burning bings, tips, and ill-drained waste land; it is only to the north-west, by the Barbauchlaw Burn, that the countryside offers pleasant walks.

There are a number of halls for social functions, two licensed hotels and a cinema. Bathgate provides additional opportunities.

Utility Services

Water is supplied by the West Lothian Water Board from a filtration plant at Stonerigg.

Gas is supplied by the Scottish Gas Board. The governor station at Armadale feeds the whole of the south-west sector of West Lothian.

Electricity is supplied by the South of Scotland Electricity Board. Power lines between Armadale and Bathgate mar the amenities.

Sewerage is being improved.

SUMMARY OF PLANNING FACTORS

The centre of Armadale is both congested and dangerous, due to the presence of through traffic.

Visually, Armadale is one of the least prepossessing of the Town Groups in the Lothians Region. This can be attributed to the exposed site, to the concentration of mining and heavy industries in the past, and to the absence of the softening qualities of mature trees.

The existing population is not yet adequately served with such facilities as schools, open space and recreation space.

There are existing mining rights to the north-east of the Burgh of Armadale.

PROPOSALS

A706 should be re-routed east of Armadale as soon as possible. Urban renewal incorporating the realignment of North Street, and the provision of car parking, a pedestrian shopping precinct, and improved social facilities should be carried out when A706 through traffic has been diverted.

Limited expansion may occur on land at present being rehabilitated, but further residential development should be restricted to replacement operations, infilling, and rounding-off in accordance with a target population of 10,000 in 1985.

Large-scale landscaping, and planting of substantial shelterbelts should be planned on rehabilitated land in the south-west, to shelter the town from prevailing winds. This should commence at an early date as it will be some years before the planting matures.

Housing close to the extensive industries at Bathville should be replaced by trees when practicable.

Proposals for Armadale are shown on Plan 14.6.

gations into development of Little Boghead Farm, which could provide sites for a thousand houses with related uses.

Industry and Employment

Bathgate is the centre of many service activities in the Region and offers a variety of jobs in road haulage, public transport, the postal services, electricity distribution, and government and local authority offices as well as numerous manufacturing industries (see Volume I, Chapter 5).

Easton colliery is still in operation and is marked by a burning bing which contributes to atmospheric pollution in the town.

The British Motor Corporation factory just south of the Burgh boundary now employs some four thousand five hundred workers of whom the majority are male, and some seventy per cent semi-skilled. Lorries and tractors are assembled from parts which in many cases are produced in the Midlands.

Community Facilities

Shopping. Bathgate is the only town in the Region which still has a live-stock market, drawing farmers and dealers from a wide area, and this has contributed to Bathgate's development as the regional shopping centre.

Additional stimulus has been given to trade by recent population increases from the influx of 'overspill' families in Blackburn and Whitburn. A considerable car-parking problem exists in the shopping area, and is aggravated by the bus stances at the centre.

Education. Existing schools in Bathgate provide secondary schooling and vocational training for children from a wide area in addition to primary education in five separate schools. A new technical college is under construction and will be completed in 1965. Playing fields are, however, inadequate, particularly for secondary school pupils.

Recreation. There is a fine park at Kirkton in addition to several areas of playing fields. Children's parks have been provided in some housing areas. Private open space includes two bowling greens, a golf course and a football ground. Bathgate's greatest open space asset is the fine hill country towards Torphichen where pony trekking is popular.

Bathgate is a centre of social activity in the Region and has numerous clubs and societies. There are a number of small halls and hotels which are suitable for dances and other social functions; cinemas; the only swimming bath in the Region; a new Library; and several restaurants and cafes.

Utility Services

Water is supplied by the West Lothian Water Board, but areas above seven hundred feet are difficult to supply.

Gas is supplied by the Scottish Gas Board. Holders near the town centre are fed from the governor station at Armadale.

Electricity is supplied by the South of Scotland Electricity Board grid sub-station, west of the town. This is a major installation and serves the whole of the Survey Area.

Sewerage is satisfactory. New trunk and outfall sewers have been provided during the last six years at a cost of a hundred thousand pounds. Nethermuir Sewage Works is being reconstructed at an estimated cost of one hundred and twenty thousand pounds.

SUMMARY OF PLANNING FACTORS

Of the Town Groups in the Region, Bathgate has the largest population, the most developed social, commercial and educational facilities, and the biggest industry. Volume I, Part II, Chapter VI, states that industrial development should not be restricted in this location, that Bathgate should be the centre for the collection of goods for despatch by rail, and that it should continue as one of the centres of education in the Region.

Development has been hampered by steep slopes and mining activities. However, the County Authority is negotiating for land suitable for residential and ancillary uses to the south-west of the Burgh.

The town's status as the Regional Centre will clearly be modified as Livingston New Town develops. Anticipating this change, a Working Party of Officers of the Town Council, County Council and Scottish Development Department was set up in February 1963 to consider: "what action was necessary to re-shape and re-equip the centre of Bathgate so that it could function well in the motor-car age". The Working Party reported in March 1964, and made recommendations to secure a ring road circulation system to allow the shopping area to be developed as a pedestrian precinct.

PROPOSALS

The Regional Consultants are in agreement with the principles of development outlined in the Working Party's Report though subsequent study of the town indicates the need for a smaller central area than that considered appropriate by the Working Party.

If, as proposed in Volume I, Part II, Bathgate is developed as the freight collecting centre for the Region, the relationship of the marshalling and goods yards to the town centre and the eastern residential areas will require consideration. It is therefore recommended that the Town Council should discuss with British Railways ways and means of reducing the effect of noise and disturbance. Extension of the goods yard on to the adjoining golf course could become necessary in the event of further expansion of facilities.

A major industrial area is proposed to the south with new roads connecting to the regional and national road systems (see Advisory Master Plan).

Apart from the development at Little Boghead now under consideration, only infilling, rounding-off, and urban renewal is proposed to accommodate a target population of 22,500 by 1985.

Proposals for a recreational park to be located east of Bathgate, leading from the Knock south to Seafield, are described in Chapter 13 of this Report.

Proposals for Bathgate are shown on Plan 14.7.

Location

The Town Group comprises Blackburn; Seafield, a mile or so to the east on the Whitburn-Blackburn-Livingston-Midcalders road, A705; and part of the Almond Valley south of Seafield.

General Description

Blackburn was once a coaching station, developing later as a result of coal and fireclay mining. Seafield developed with the shale oil industry in the nineteenth century. Large shale-waste bings remain to the north of Seafield. Existing fireclay mining rights and danger of subsidence from coal workings have inhibited further development west of Blackburn. Generally, the visual approaches to Blackburn are good. Recently-built five-storey flats rising above the skyline symbolise the rapid growth resulting from an agreement with Glasgow Corporation to receive overspill families.

Communications

The north/south B792 Torphichen-Bathgate-Addiewell road crosses A705 at the core of the early settlement. Both roads carry heavy traffic through the urban area. A8, the Edinburgh-Glasgow road, is a mile north of A705 and runs parallel with it. Good bus services are available to Edinburgh, Glasgow, Bathgate and nearby villages.

Population and Housing

The population of the Town Group in 1961 was around 5,500 but this has increased rapidly with the development of housing provided mainly for B.M.C. workers.

The old village of Blackburn is in poor condition and a number of houses have been vacated. Miners' rows at Seafield are gradually being closed. In all, up to one hundred houses may have to be replaced within the next twenty years. Planning permission has been granted for some private housing.

Industry and Employment

Many male workers from Blackburn are employed in the B.M.C. factory at Bathgate. Other main sources of employment are coal mines at Riddochhill and Whitrigg, and the fireclay mines at Whitrigg. Employment opportunities for women are limited to service jobs. The County Council is proceeding with development of an industrial estate at Whitehill.

Community Facilities

Shopping. Shopping facilities are inadequate and much of the commercial property is in poor condition. There are no shops in the new housing areas but a new shopping centre is planned and the first phase of ten shops and a supermarket is to be constructed soon.

Education. Existing schools are too small for the increased population. All secondary schooling is provided in Bathgate. A secondary school is under construction and other schools will be required to phase in with the rapid increase in numbers of young children.

Recreation. Blackburn has a park with football pitch, bowling green and tennis courts but this is insufficient for the increased population. An extensive area of peat moss and waste shale to the east of the town has been acquired by the County Council for rehabilitation. Seafield has a football pitch, children's play area and bowling green, associated with the Miners' Welfare Institute. The

local Miners' Welfare Institutes are centres of social activity and provide welcome opportunities for the new families from Glasgow to meet their neighbours. Blackburn's new Town Centre Scheme when completed will include a dance hall, community hall, library, hotel/public house, restaurant, cafe and bowling alley, and will radically change Blackburn's traditional dependence on Bathgate.

Utility Services

Water is supplied by the West Lothian Water Board.

Gas is supplied by the Scottish Gas Board from the governor station at Armadale.

Electricity is supplied by the South of Scotland Electricity Board.

Sewerage is designed to take effluent from the future industrial estate at Whitehill and from the B.M.C. at a works near Seafield on the River Almond.

Seafield has a small plant with capacity for a population of 1400.

SUMMARY OF PLANNING FACTORS

Of all Town Groups in the Region Blackburn creates the strongest impression of growth but social facilities have not kept pace with the housing programme. The old village, nearing the end of its useful life, contrasts dramatically with the new development.

Blackburn is well situated in relation to the expanding industrial concentration to the north, and to Livingston New Town. The existing residential area is free from industry, and large scale rehabilitation is proceeding east of the built-up area. There is scope for the creation of a good environment in the Town Group.

Heavy traffic causes danger and congestion on the north/south and east/west routes which pass through the town.

Danger of subsidence and existing fireclay mining rights limit expansion to the west. Expansion to the north is prevented by the future M8 motorway.

PROPOSALS

The Town Group is capable of further expansion to accommodate up to 15,000 persons by 1985. Building land is available to the east of the town and north of A705 for the bulk of the development implied by this increase. Seafield should not be expanded and miners' rows north of A705 should not be replaced on their present sites.

A new access road from A705 will be needed to serve the industrial estate proposed north of Blackburn. The road should be constructed west of the town. To discourage through traffic from continuing to traverse the urban area by B792, this route from the south should be realigned westwards at its junction with A705; its continuation north should be diverted to the proposed industrial road in order to bypass the urban area. The A705 through route could only be realigned at considerable cost and it is therefore recommended that, in order to reduce local accesses and crossing traffic, the southern frontage should be freed from development as it becomes practicable to do so.

The rehabilitation scheme for the area east of Blackburn and north of Seafield, Easter Inch Moss and Seafield bing area, should be developed as a County Park with pedestrian links to the Bathgate Hills area, and to parkland in the Almond Valley.

Proposals for Blackburn are shown on Plan 14.8.

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Proposals for Blackburn are shown on Plan 14.8.

Location

Twelve miles west of Edinburgh A899 diverges from A8 to form the main street of the two mile linear town of Broxburn/Uphall.

Approaching by road is visually stimulating: spent-shale bings dominate the scene, and prominent church spires punctuate the skyline.

General Description

Eighteenth century Kirkhill House and miners' rows indicate the town's historical development from an early rural settlement to an industrial one dependent upon the oil-shale industry in the nineteenth and early twentieth centuries. The virtually treeless commercial centre of Broxburn today is a focus of shopping and entertainment second only to Bathgate in the Region. Local Authority housing to the north of A899 links Broxburn centre to the lesser village of Uphall over a mile away. The Oatridge Hotel, a former coaching inn, provides a lively reminder of Uphall's importance as a stage on the Edinburgh/Glasgow turnpike road in the eighteenth and nineteenth centuries. Uphall is mainly residential and has many fine trees. The headquarters of Scottish Oils is at Middleton Hall where workers' housing was developed by the Brox Burn.

Population and Housing

The Town Group's population has fluctuated with the fortunes of the oil shale industry. In 1961 the population was over 10,000 and by natural increase it could be expected to rise to 14,000 by 1985. The percentage of inhabitants aged over thirty five is rather higher than in the Survey Area as a whole.

Uphall has a high proportion of privately owned houses. Scottish Oils is selling to the Local Authority and to individuals houses which were built for its workers but are no longer required since the shale industry has ceased operation. Over seven hundred houses in the Town Group may have to be declared unfit for human habitation over the next twenty years.

Communications

A8, the Edinburgh-Glasgow road, forms the southern boundary of Broxburn/Uphall. The main street of the town, A899, has poor junctions with A8 east and west of the town. A north/south route crosses Uphall, linking it with Pumpherston and West Calder to the south, and with A9, Edinburgh-Thurso, to the north. A further road runs north to Winchburgh, on A9, from A899 at Broxburn's commercial centre.

Frequent bus services link the town with Edinburgh and Glasgow and smaller centres en route. Less frequent services are available to Queensferry, Winchburgh, Linlithgow, Bo'ness and Grangemouth in the north, and to Pumpherston and Midcalder in the south.

There is no railway passenger station but Holygate goods station midway between Broxburn and Uphall is still in use.

Industry and Employment

The area was one of the main centres of the oil shale industry, and has been reduced to an unsatisfactory economic state by the decline of this industry. Recently some firms and branches of firms have moved from Edinburgh to the area, and these are helping to provide employment and to diversify the industrial structure. Details of individual firms in electrical and general engineering, sewing thread, jute sacks, etc., are given in Volume I, Chapter 5, 'Industry and

Employment'. At present employment opportunities for women are limited and there is a considerable amount of travel to work to Edinburgh as well as to Bangour Hospital. A site to the east of Broxburn is being developed by a potato crisp firm and additional land is available for industrial use in this area.

Community Facilities

Shopping. The principal shopping centre is at Broxburn. Development occurs on both sides of the main street, which is seriously congested by parking, service vehicles and buses. Subsidiary groups of shops are sited at Uphall along A899.

Education. Broxburn Academy, a new Secondary School, has been built near recent housing between Uphall and Broxburn. The buildings formerly occupied by Broxburn High School are now used for primary education. St. Nicholas Roman Catholic Primary and Junior Secondary School is in outmoded premises as is the primary school at Uphall which will shortly be replaced. The new Academy is the only school with adequate playing fields.

Recreation. Broxburn/Uphall has more private than public open space. There is a golf course at Uphall; bowling greens, tennis courts and a football ground at Broxburn. A public park is sited south of A8 and access to it is becoming more dangerous and difficult as traffic increases on A8. Children's playgrounds are provided in some housing groups but these are inadequate in number. None of the residential areas in Broxburn/Uphall is far from the countryside. The Union Canal flows through Broxburn and its tow-path provides a pleasant footpath to the north and south. It is from this footpath that the Town Group can best be appreciated with its background of hills, rocky outcrops and truncated bings. Seven halls in addition to church halls are used by numerous organisations and societies which include pipe bands, drama groups, merchants' associations and pigeon fanciers' clubs. Two cinemas are in use in Broxburn and one in Uphall is now a dance hall; a community centre has been established mid-way between Broxburn and Uphall and there are a dozen or so public houses, almost all on the main street.

Utility Services

Water is supplied by the West Lothian Water Board.
Gas is stored at Pythall. It is supplied by the Scottish Gas Board from the production plant at Granton.
Electricity is supplied by the South of Scotland Electricity Board. 132 KV overhead cables cross the town.
Sewerage is being improved. A new works is under construction at Haughs Farm and will eventually be used for storm water when an additional site at Hallyards Castle is developed. Refuse is also expected to be dealt with at Hallyards.

SUMMARY OF PLANNING FACTORS

Broxburn/Uphall is a linear settlement having three separate but fairly well-defined areas based on the original communities of Broxburn, Uphall and the recent County Council housing. Considerable urban renewal is essential, particularly in Broxburn, and some alterations to the local road system are needed to obviate congestion.

Proximity to Edinburgh has in the past discouraged social and commercial development in the town but in recent years industries and other uses have been attracted from Edinburgh's congested areas. These new employment opportunities are helping to reduce unemployment occasioned by the closing of the shale mining industry.

Further development is however necessary.

Broxburn/Uphall is most favourably located in relation to developing communications: the proposed M8 and M9, the new Forth Road Bridge, and Turnhouse Airport. These roads will conveniently connect the area to Edinburgh, Glasgow, Grangemouth/Falkirk and Fife. Improved links are necessary to Livingston New Town.

Rehabilitation of industrial dereliction north-east of Broxburn is essential to improvement of the urban environment.

PROPOSALS

A Working Party consisting of Officers of the Local Authorities and the Scottish Development Department has been set up to consider central area redevelopment for Broxburn/Uphall. The first meeting was held on 28th October, 1964. The Regional Consultants consider that the following points of principle should be borne in mind in the formulation of proposals for the Town Group:-

- 1 Improved road access should be provided to Livingston New Town.
- 2 Essential services and new roads should be provided to the industrial area proposed east of Broxburn in order that its potential can be realised as soon as possible.
- 3 Priority should be given to the rehabilitation of the bing complex north of Broxburn and the creation of a County Park.
- 4 Separation of people and traffic should be an essential feature of the redevelopment of the centre at Broxburn.
- 5 The Town Group should be expanded to cater for 20,000 persons by 1985, with provision for further substantial expansion north of the present town beyond that date.
- 6 A899 should cease to be used as a through route.

Proposals for Broxburn/Uphall are shown on Plan 14.9, incorporating these points of principle.

Location

The Town Group area of Ecclesmachan comprises the small community of this name over a mile north of Uphall, the hospital complex at Bangour and Dechmont, and an extensive area of agricultural land.

General Description

Ecclesmachan is a small, pleasant village. It lies in a valley between Uphall on A899 and Threemiletown on A9. The church to the north of the Ecclesmachan Burn contains mediaeval fragments although dating mainly from the eighteenth century. The surrounding countryside has some vantage points such as Binny Craig on which beacons were lit at the time of the Spanish Armada.

Communications

The village is situated at a bend of B8046, the road from Uphall to Threemiletown, while Bangour Hospital is situated just west of the junction of A899 and A8 about one and a half miles west of Uphall. Buses from Broxburn to Linlithgow stop at Ecclesmachan. Bangour Hospital is served by about one hundred and thirty buses a day. The nearest railway station is at Linlithgow.

Population and Housing

The 1961 population in private households in the village and surrounding area was over 400. Over 1,700 persons were enumerated at Bangour Hospital which is one of the largest in south-east Scotland. A dozen or so houses can be expected to be declared unfit for human habitation during the period of the Plan.

Industry and Employment.

There are no industries at Ecclesmachan. At one time stone from the nearby Binny quarries was used for building work in Edinburgh, but these quarries are now being filled with refuse. Bangour Hospital is one of the largest sources of service employment in the Region, and provides a wide range of general, specialist and mental health services.

Community Facilities

There is no longer a school at Ecclesmachan and the school building is used for social purposes. The nearest shops, schools and entertainment facilities are at Uphall and Broxburn. There is a small infant school at Dechmont, and a wide range of facilities is available in the hospital for staff and patients. Dechmont has a park with a football pitch and playground.

Utility Services

Water is supplied by the West Lothian Water Board from a storage tank at Waterstone.

Gas is not available to the village of Ecclesmachan.

Electricity is supplied by the South of Scotland Electricity Board.

Sewerage is by septic tank of limited capacity. Development in the village has been restricted on this account.

SUMMARY OF PLANNING FACTORS

The village of Ecclesmachan has a rural character and is set in countryside of high scenic value. It is dependent on Broxburn/

Uphall for most of its social facilities. Some rehabilitation is already in progress on such eyesores as do exist. There is a demand in this area for middle- and upper-income housing.

Bangour Hospital will be largely replaced within the period of the Plan by a new regional hospital at Livingston New Town. Only psychiatric services will remain at Bangour.

PROPOSALS

The Regional Consultants are of the opinion that future development should not impinge directly on the existing rural village. However, an excellent site on which private housing could be integrated with pleasing landscape is located to the west of the village. Such a community should be large enough to support basic social, shopping, educational and utility facilities which could then be enjoyed by existing residents of the Town Group. High incidence of car ownership could be expected and new access roads would be required. Development for middle- and upper-income 'executives' should be encouraged here.

The population of this Town Group in private households should not be greatly in excess of 2,000 by 1985.

Location

The Town Group consists of Winchburgh and surrounding countryside. Winchburgh is ten miles from Edinburgh on A9.

General Description

The settlement developed on either side of the road and grew rapidly after the discovery of oil shale in the nineteenth century. Local Authority and Scottish Special Housing Association housing has doubled the area of the town since the extraction of shale oil and brick manufacturing ceased.

Communications

The town is sited on a dangerous bend of the road, A9, with B9020, Woodend-Broxburn, passing north and south through it. Edinburgh to Stirling buses pass through Winchburgh at half-hourly intervals; another half-hourly service connects with Broxburn. The Edinburgh-Glasgow railway line crosses Winchburgh in tunnel and cut. The nearest passenger station is at Linlithgow.

Population and Housing

The 1961 Census figure for the Town Group was over 2,600 persons. Housing development has continued during the past twenty years. Some miners' rows have been demolished, and others sold by Scottish Oils to private owners. Some two hundred houses will probably fall below acceptable standards in the period to 1985.

Industry and Employment

There are very limited employment opportunities at Winchburgh, and as a result most people travel to work. Development is, however, taking place on the site of a former shale mine, and there is some work in building and contracting.

Community Facilities

Education. The schools in Winchburgh are out-moded and plans are in hand for replacement. Senior secondary pupils travel to Linlithgow.

Shopping. Shopping facilities are limited and almost wholly on the main street (A9).

Recreation. Open space within the town is minimal and school children and the general public share the only playing field. There are two tennis courts and a bowling green. There are some fine walks north and west of Winchburgh where the land is still in agricultural use or afforested, in contrast to the derelict land to the south where vast shale bings on both sides of the road have earned the route the local name of 'the Canyon'. Social facilities are again limited and there is some allegiance to both Broxburn and Linlithgow, as well as to Edinburgh.

Utility Services

Water is supplied by the West Lothian Water Board. Gas produced at Granton is available from the Scottish Gas Board. Electricity is supplied by the South of Scotland Electricity Board. Sewerage is limited: the sewage works was recently reconstructed but will require expansion when the population reaches 3,300.

SUMMARY OF PLANNING FACTORS

Winchburgh is a small settlement once based on the shale industry; it now requires alternative sources of employment.

There is a demand for middle-income housing in this sector of the Region, and some good building land exists on the western fringe of the town.

An alternative to A9 is essential to relieve Winchburgh of heavy through traffic. Winchburgh's environmental quality is also seriously affected by adjoining industrial dereliction.

PROPOSALS

The proposed M9 will relieve Winchburgh of much of the through traffic. A new regional road should be provided to link the Town Group with Broxburn/Uphall and Livingston New Town.

Development of Winchburgh to accommodate approximately 5,000 persons by 1985 should be achieved by expansion westwards.

Properties north of A9 at Winchburgh should not be replaced when they have reached the end of their useful life, to avoid the necessity of constructing an excessively expensive by-pass for local through traffic.

South of Winchburgh the land should be rehabilitated to provide a County Park. The derelict brick works north of A9 should be rehabilitated for industrial purposes.

Proposals for Winchburgh are shown on Plan 14.10.

Location

Kirkliston/Newbridge Town Group comprises the villages of Kirkliston on A9 and Newbridge on A8, both some three and a half miles from the Edinburgh boundary. The County boundary follows the River Almond, placing Kirkliston in West Lothian and Newbridge in Midlothian.

General Description

Kirkliston shows evidence of occupation in the sixth century A.D., and Edward I camped near the village in 1297 while waiting for supplies to arrive by sea. The village contains a thirteenth century Parish Church and a number of seventeenth and eighteenth century houses in reasonable repair.

Newbridge appears to have originated at a point convenient for crossing the River Almond. In the nineteenth century Irish workers settled here and helped to construct the Union Canal.

Communications

Kirkliston has developed where A9 crosses B800. The latter, an approach road to the Forth Road Bridge, is heavily used by commuters to and from Edinburgh which causes congestion at the cross-roads. A8 by-passes Newbridge, and further east a road runs south from it to Ratho, a large village outside the Lothians Survey Area.

Kirkliston is served by the Edinburgh-Stirling bus route, in addition to routes to Linlithgow, Queensferry and Newbridge. Newbridge is well-served by the Edinburgh-Glasgow bus route.

The railway line from Ratho to Dalmeny runs through Kirkliston. The nearest passenger facilities are at Dalmeny.

Edinburgh's Turnhouse airport lies east of Newbridge between A8 and A9.

Population and Housing

The population of the Town Group in 1961 was over 2,600; the population structure differed from that of the Region since it showed higher percentages of people aged twenty-five and over, and of women than men.

Some fifty dwellings in the Town Group are expected to fall below acceptable standards in the period of the Plan. Some Local Authority housing has been completed recently and planning applications have been considered for private housing.

Industry and Employment

A distillery at Kirkliston, and a joinery works and poultry processing plant at Newbridge, are the main local industries, and many residents journey to work beyond the area. Extensive industrial development is expected to proceed south of Newbridge as a result of negotiations during the past few years.

Community Facilities

Education. Both Kirkliston and Newbridge have small primary schools, but senior secondary pupils travel from Kirkliston to Linlithgow and from Newbridge to Ratho. Roman Catholic pupils travel to Broxburn.

Shopping. Shopping facilities are limited and shoppers travel to Broxburn and Edinburgh for their needs.

Recreation. Kirkliston has a tennis court and bowling greens, but no playing fields. Newbridge is similarly under-provided with indoor and outdoor facilities. The permanent showground of the

Royal Highland Agricultural Show is east of Newbridge and has a go-kart racing track used by an East of Scotland club.

Utility Services

Water is supplied by the West Lothian Water Board.

Gas is supplied by the Scottish Gas Board from the production plant at Granton.

Electricity is supplied from the grid sub-station at Bathgate.

Sewerage is not satisfactory.

SUMMARY OF PLANNING FACTORS

Kirkliston and Newbridge are small villages, with very limited community and utility services, adjoining Edinburgh's green belt.

Land is required near Kirkliston and Newbridge for a new road to the Forth Road Bridge, and for the M8/M9 intersection.

The conveniently located roads and airport are expected to attract industries.

Some noise and nuisance from road and air traffic are unavoidable in this location. Industries with these characteristics could be accommodated in the vicinity with less disturbance to inhabitants than in other parts of the Region.

PROPOSALS

The Town Group's population should be no more than 3,500 by 1985, and the limited development implied by this figure should be achieved by urban renewal, infilling and rounding-off to improve the urban environment of Kirkliston.

Further industrial land at Newbridge should be reserved for concerns which are unsuitable neighbours to residential areas.

SUMMARY

Survey

Bathgate is the most important town in the Region and has well-developed shopping, educational and social facilities, and substantial industries.

Broxburn/Uphall has less developed facilities and is second to Bathgate in size, variety of employment opportunities and social facilities.

Visible evidence of a surge of new growth in the Region is especially apparent at Whitburn, Blackburn, and Bathgate.

Many settlements in the Lothians Region suffer from congestion of main streets due to the presence of through traffic. The absence of adequate parking and off-loading facilities in outmoded shopping areas increases the congestion and is particularly evident in the cross-roads towns of Armadale, Whitburn and Blackburn.

The existing population lacks variety of employment opportunities; journeys to work from Town Groups such as Fauldhouse and Addiewell are lengthy; the greatest variety of jobs and the largest inflow of workers is to the Bathgate area.

The quality of environment in all Town Groups is adversely affected by areas of dereliction, and the presence of declining industries in close proximity to residential areas.

Town Groups are not yet adequately provided with community facilities such as schools, open space, and indoor accommodation for social purposes, although individual communities may be well provided, e.g. Polbeth - open space.

The existing stock of houses includes some two thousand dwellings of unacceptable or near unacceptable standard dating mainly from the era of expansion of extractive industries.

Sewerage is in need of improvement in some Town Groups.

The built-up area of the Town Groups and adjoining industrial sites is approximately four thousand acres.

Proposals

MID & EAST CALDER, with a population of 15,000 in 1985, should be a centre of recreational activity in the Region. Some of its rural character should be retained by careful integration of residential development for middle-income housing into the well-wooded surroundings. Good connections to the New Town and industrial areas should be developed as soon as practicable.

WEST CALDER/POLBETH should be a more unified town. An attractive centre, free of A71 traffic, should be created by urban renewal at West Calder, and the population increased to 13,000 by 1985. Rehabilitation should be carried out with a view to development of Mossend beyond 1985.

ADDIEWELL's dispersed grouping of settlements should be given new visual and physical identity by the provision of a valley crossing, and development of further housing and public buildings overlooking open space in the valley of the Breich Water. The population of 8,000 in 1985 will then support a wider range of facilities than is available to the present residents.

FAULDHUSE should be made more attractive by urban renewal, and by afforestation to create shelter and spatial enclosure. Transport links with the New Town should be developed to ensure that new opportunities open up as existing sources of employment decline. The population in 1985 should not exceed 6,000.

WHITBURN, with a population of 10,000 in 1985, should become a more compact town, clearly defined by physical boundaries. Proposals are mainly directed at improving the town's community facilities.

ARMADALE should be improved by reclamation of waste land and shelter planting. Redevelopment of a traffic-free centre should be urgently pursued to improve the environmental quality of the town for the anticipated population of 10,000 in 1985.

BATHGATE should be planned to support some shopping, social, educational and transport facilities for a population in excess of the 22,500 recommended for this large sub-centre in the Region. Industrial activity can be expected to expand, and land should be made available for this purpose.

BLACKBURN should be the most compact of the larger towns because of its residential density and complete physical separation from industry by open space and M8. A wide range of facilities should be available to the population, which should reach 15,000 by 1985.

BROXBURN/UPHALL should become a substantial linear development for a population increased to 20,000 by 1985. Close links with the New Town should be fostered by ease of access. The areas of dereliction should be rehabilitated and factories laid out in planned estates to improve the environment.

ECCLESMACHAN should retain a predominantly rural character. Integration of houses for middle-income 'executives' in the vicinity of the present village should be encouraged, bringing the population to 2,000 by 1985.

WINCHBURGH should be improved by rehabilitation in the vicinity, and some 'commuter' immigrants should be attracted to the neighbourhood. A population of 5,000 in 1985 is proposed, and should be able to support additional facilities. Ready access should be provided to both Broxburn/Uphall and Livingston.

KIRKLISTON/NEWBRIDGE should not have a population in excess of 3,500 by 1985, having in mind that the character of the area will be affected by the creation of substantial industrial and service undertakings near Newbridge, and by the external influences of communication networks developing in the vicinity.

Cumulatively, these proposals increase the built-up area of the Town Groups and adjoining industrial sites to approximately eight thousand, three hundred and fifty acres.

Chapter 15. LANDSCAPE STUDIES

INTRODUCTION

Landscape studies were initiated to collect the information needed to consider the problems of improving the physical environment. The subjects involved in this process were Agriculture, Forestry, Recreation, and Rehabilitation. One of the principal difficulties was to demonstrate the complex relationships between the main land users. This Chapter integrates and expands the various proposals recommended in the respective Chapters of this Report and explains the inter-relationship of these land uses shown in the Advisory Master Plan for the Lothians Region.

SURVEY

Three primary factors were chosen on which to base the study: Topography, Land Fertility and Woodlands. From these three primary factors information and inferences were drawn and expressed diagrammatically on Map 15.1, 'Landscape Analysis'. This Map divided the entire Region into eight possible types of landscape and by this method every possible land use was covered by one of the classifications of landscape.

The Types

The method of classification is described in Appendix J. The types which were produced are :

- 1 Lowland - fertile - wooded
- 2 Lowland - fertile - treeless
- 3 Lowland - poor - wooded
- 4 Lowland - poor - treeless
- 5 Upland - poor - wooded
- 6 Upland - poor - treeless
- 7 Upland - fertile - wooded
- 8 Upland - fertile - treeless

(Since there is no 'fertile' land above eight hundred feet, groups 7 and 8 can be removed, leaving six basic types.)

- 1 Lowland - fertile - wooded

This is idealised countryside, a blend of pastoral and arable sheltered farmlands and small mixed woods, planted for amenity and protection. Most of the Livingston Designated Area and large sections north of the A8 between Bathgate and Kirkliston are of this type. The high tree density is due to the number of well-wooded agricultural estates with comprehensive shelterbelt systems laid down in the eighteenth and nineteenth centuries, and also to tree growth on ground unsuitable for cultivation due to excessive slope, bad drainage or rock.

- 2 Lowland - fertile - treeless

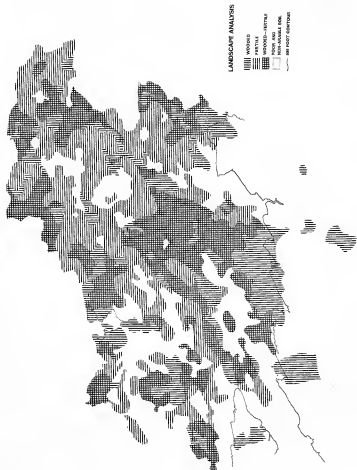
This type of landscape is devoted almost entirely to intensive arable and mixed farming on deep soils closely associated with alluvial deposits, and on boulder clay in areas of good drainage, slope, orientation and topographic shelter. Its distribution is erratic over the Region below eight hundred feet, but with a greater concentration in the eastern area near Broxburn and Pumpherston, and between East Calder and Kirknewton. Trees are not entirely absent, but are restricted to boundaries and hedgerows.

Due to the lack of vertical relief, expansive views are common even from slight elevations, and buildings, power lines, bins and tips are more obtrusive than in type 1.

- 3 Lowland - poor - wooded

Three distinct sub-groups comprise this type: shelterbelt farming; country house estates; and natural regeneration and plantation woodlands.

Shelterbelt farming is found on the poorer quality arable land of the lower Pentland slopes. The utilitarian planting of well-wooded estates such as Harburn, Hartwood and Kirknewton exemplifies this group. Relying very much on sheep and cattle as an end product, this farm system depends on summer-grazing the upper non-arable, unsheltered hill slopes, and on overwintering in these sheltered lower quarters.



Country house estates were often developed on land which was unsuitable for agriculture, but which had pleasant prospects. Improved by policy tree planting, and often with the addition of a lake in the seventeenth and eighteenth centuries, these estates have a very high internal and external amenity value. Examples are to be found throughout the Region, e.g. at Polkemmet, Bangour, Newliston, Carlwrie, Kirknewton, Calder House. The urban settlements of Polbeth and Midcalder fall within this group.

Woodlands will develop by natural regeneration or can be planted on most uncultivated ground which is neither grazed nor mown. These conditions occur throughout the Region, along river and canal banks, railway embankments, peat mosses, and on some of the older abandoned industrial sites. The best examples are to be found in the Almond Valley between Midcalder and Newbridge, Calder Wood, Houston Wood, Drumshoreland and Selm Muir. Plantation planting is generally restricted to conifers and is either Forestry Commission owned, or run under a Dedication scheme.

4 Lowland - poor - treeless

Three distinct sub-groups share the same characteristics of this type: industry; urban settlements; and poor or non-agricultural land.

Industry, both viable and derelict, dominates this landscape. The distribution of the older coal and oil industries is remarkably even and regular, being the result of the systematic exploitation of the underlying mineral measures. Their location can be closely identified with the waste material which surrounds them (see Map 7.1).

The major urban settlements within the Region are all below the line of 'Uplands' at eight hundred feet elevation. Fauldhouse, the highest, straddles the seven hundred and fifty foot contour, and rises to eight hundred feet. Usually, but not invariably, they are closely associated with industry. Trees are generally absent from the mining villages, and this makes an interesting comparison of environment with the adjacent well-wooded private estates.

The poor or non-agricultural group is found on the marginal arable and rough sheep grazing land round many of the settlements, on abandoned industrial sites, and on the foothill approaches to the higher hills. Shelterbelts are decayed, devastated, or non-existent. There are areas of poor drainage, peat moss and marsh (see Map 2.3).

5 Upland - poor - wooded

Three sub-groups complete this type, which occupies a very small fraction of the uplands: natural woodland; shelterbelt agriculture; and plantation woodland.

Natural woodland, mainly of birch scrub, is found sporadically throughout the uplands where grazing is impeded. Trees are seldom more than fifteen feet high.

Shelterbelt agriculture is represented in the upland zone of Crosswood Hill, an outstanding example of land reclamation in 1803 by drainage and afforestation. There are also good examples at Harburn and Leithhead. By treatment of this sort, marginal arable agriculture can exist successfully up to at least one thousand feet elevation. Unfortunately, generally due to lack of management, most of the shelterbelts are now either overmature or in need of maintenance and replacement; in spite of various forms of financial assistance, very little new planting is being done.

Plantation woodland in the uplands is found at Harburnhead Hill (950 feet), Breich (800 to 1,000 feet), Fauldhouse Moor (800 to 900 feet),

and in the Bathgate Hills (850 feet). The monoculture of conifers is the rule, but a proportion of deciduous larch relieves the sombre green monotony. The Forestry Commission are the largest owners and developers of this class of woodland.

6 Upland - poor - treeless

Most of the southern uplands rising to over one thousand eight hundred feet, parts of Fauldhouse Moor, and the Bathgate Hills fall within this category. This land is mainly heather and grass moorland, with few roads, badly drained and exposed to wind. It is devoted almost entirely to low density sheep grazing, with occasional cattle, and includes the large areas of water at Cobbinshaw, Harperrig, and Crosswood reservoirs, and their catchment areas. A few isolated farms with adjacent fields enclosed by dry stone dykes complete the scene.

PROPOSALS

A Linear Park

It is proposed that a linear park system be established following the main water drainage channels of the Almond Basin system, expanding and contracting along its length in conformity with the pressures of population and the availability of land.

The adoption of this idea obviates the need for major alterations to allow underpasses since they are provided at each major road - river intersection.

The drainage system is comprehensive enough to provide the theoretical basis of a regional walkway system.

Proposals are set out below for the six landscape types:-

- 1 Lowland - fertile - wooded
- 2 Lowland - fertile - treeless
- 3 Lowland - poor - wooded
- 4 Lowland - poor - treeless
- 5 Upland - poor - wooded
- 6 Upland - poor - treeless

- 1 Lowland - fertile - wooded

It is considered that with the exception of the Livingston Designated Area, and the immediate environs of the expanding settlements, development of the 'fertile' types of landscape should be avoided whenever possible. These wooded farmlands are a valuable visual and cultural asset. Wherever possible, the land should be planned for multi-use to alleviate and control the pressures at present on it. Much of the countryside could be recreational open space if the public were educated to respect it. The proposed increase of the Region's population (230,000 by 1985) with a corresponding demand for leisure facilities will have widespread effects, especially on the farmlands. The problem is to provide the maximum choice of activities compatible with the rights of existing users and owners, and provision must be made for the needs of the pedestrian and the motorist.

For Pedestrians. It is proposed that a linked walkway system be established throughout the rural areas, taking advantage of rights of way, shelterbelts, disused railways and other types of non-arable land, to connect all the settlements, parks, forests and 'unlimited access' areas. This system of limited walkways would ramify throughout the Region connecting with Livingston, with the neighbouring regions of the Pentlands, Edinburgh's green belt, the Forth fore-

shore, Falkirk-Grangemouth, and the moorlands to the west. It could follow many of the linear elements in the landscape, such as rivers and paths which cut diagonally across the pattern of roads, thus fulfilling the essential requirement of vehicular separation.

For Motorists. It is proposed that for the motoring public a system of car parks, picnic spots, and access areas be provided throughout the Region, using the rural road network and non-arable and derelict land.

It is expected that an increasing number of people will use cars for recreation. By utilising the present second and third class road system and providing off-road parking at places of interest, historic sites, good viewing points and sheltered areas, the whole of the rural region served by secondary roads could be regarded as 'the motorists' park' for the enjoyment of the same countryside as that used by pedestrians but separated from it. Parking areas would vary in capacity, depending on the size of the recreation space, thus acting as a limiting factor to over intensity of use. The spaces could include much of the present non-arable land, quarries, rocky outcrops, small bings and moorland. Those in which natural regeneration has taken place are already attractive. Others, with the minimum of attention, could be made so.

To achieve this system, the following action is recommended: the creation of an efficient warden service (similar to the national parks); the competent planning and design of routes, picnic spots and accessories; continuous public relations service; and education of the public from school age.

As a means of implementing the last two recommendations, the following proposal is suggested to combine education and recreation profitably: an exhibition farm be established, planned to attract, accommodate, entertain and educate large numbers of the public, especially school-children, in the ways of the countryside. The object would be to create a 'high density' 'all the year round' use in the rural area.

The design of the farm could achieve complete segregation, providing maximum viewing and safety to the public, while allowing the everyday activities of the farm to proceed without interruption. A suitable site would be adjacent to Winchburgh. If the regional school population of forty-five thousand in 1985 visited such a feature three or four times per year, it would provide invaluable opportunities and facilities for teaching nature study, the elements of farm husbandry and the 'Country Code'.

2 Lowland - fertile - treeless

This type completes the balance of good agricultural land in the Region. The restrictions on urban development apply here too. There are a number of specific problems in this type which require attention.

Tree Planting. The scarcity of trees is due to intensive cultivation, resulting in few hedgerows and copses and almost complete lack of woodland management. Much of the shelterbelt system planted in the eighteenth and nineteenth centuries was either felled in the Great War and not replaced, or is now over-mature and decayed. It is proposed that tree-planting be undertaken throughout this landscape type to improve the micro-climate and amenity, and that a scheme be prepared to establish in greater detail where planting should be. Consideration should also be given to methods of persuading owners and farmers to participate.

The Local Authorities, Forestry Commission, Department of Agriculture and National Farmers' Union should all be involved in an effort to utilise waste land, field corners, road verges and decayed shelterbelts. Management imposes its own problems. Many farmers have neither

the skill nor the time to look after trees. New planting designs and uses of species will have to be employed to make planting, maintenance and harvesting an efficient and economic feasibility. The establishment of trees in block and linear patterns could also be complementary to the 'linked walkways' proposal.

The Union Canal. Another element of inestimable value to the walkway and recreation system is the Union Canal (see Map 2.5), and it is proposed that it and the towpath be retained and improved as an essential part of the regional recreational facilities. Its scenic and historic uniqueness justifies the considerable expenditure of time and money which this would entail. It could possibly be developed for boating, canoeing and camping, as well as linking the Region and Edinburgh's green belt, Linlithgow and the Grangemouth-Falkirk Growth Area.

Allotments. The shorter working week and the need for therapeutic leisure activities indicate the desirability of providing allotments. It is therefore proposed that extensive allotment areas be located within easy walking or motoring distance of Livingston, and that they be provided with car-parks, toilets, water, enclosing wind breaks, rubbish collection, compost delivery, hire of machinery, garden club and lecture rooms.

3 Lowland - poor - wooded

This landscape type should be repeated on the lowland - poor - treeless land. In general it is proposed that every effort be made to retain and improve woodlands, so that they may be utilised in the urban and rural recreation network and may improve the micro-climate and amenities. Three sub-groups comprise this type: shelterbelt farming, country estates and natural regeneration and plantation woodland.

Shelterbelt farming. It is proposed that the present system of shelterbelts be improved and replaced wherever necessary and that new techniques of design, planting and management be used where necessary to make them economically viable.

Country Estates. It is proposed that the well-wooded estates wherever possible retain their identity as single entities, and be preserved and developed as public open spaces or for institutional uses or self-contained residential communities.

Natural regeneration and plantation woodland. It is proposed that natural regeneration be encouraged on derelict and non-arable land by fencing to exclude animals and by planting pioneer trees to assist further growth. This treatment should be followed by a suitable after-use of the area for active recreation, utility timber production or shelter.

Most of the present plantation woodland is owned by the Forestry Commission who have an established forest at Selm Muir. It is suggested that Selm Muir forest be treated as a regional pilot study area for 'limited access' public open space. The public may be excluded from all or part of this area, under conditions of fire danger, felling hazard, or risk of vandalism. Car parks and walkways should be provided.

Another area of two hundred and fifty acres at Calder Wood has recently been acquired by the Forestry Commission; it includes the confluence of the Linthouse and Murleston Waters, and is close to their merger with the Almond. This area is invested with a significance beyond that of purely economic forestry, making these three main arteries of the regional park system comparable in value with Edinburgh's Queen's Park. It is proposed that Calder Wood be used

primarily as a park, planted with both economic and ornamental species to provide the Forestry Commission with timber and the public with space. It is unreasonable to devote this large area of scenic attraction, close to a high concentration of town people, exclusively to economic forestry.

It is proposed that a large caravan site and motel be established in the north-east corner of the Region near Kirkliston and M9/A9 intersection, convenient to Edinburgh and main routes to Glasgow, Stirling and, via the Forth Road Bridge, to the Highlands. The improved A1 from the south provides a good tourist route to Edinburgh and the Highlands and the proposed caravan site would be strategically placed for this traffic.

4 Lowland - poor - treeless

Wherever possible, it is proposed that this type of landscape be used in preference to all others for urban or industrial development. There are three sub-groups: industry, urban settlements and poor, non-agricultural land.

Industry. This sub-group includes the major areas of industrial dereliction where rehabilitation projects have been proposed (see Appendix D, Tables 7.3 to 7.7). There is an important distinction between the shale bings (the major part of the problem) and other types of waste, from coal, sand and clay workings. Waste shale now has considerable value as a building material for foundations and infilling, and to completely restrict its exploitation would delay development and increase building costs. It is therefore proposed that the majority of the bings be landscaped and that a co-ordinated programme of quarrying by contractors be implemented for the removal of the remainder, followed by similar removal of treated bings by controlled methods.

Urban Settlements. With few exceptions, the urban settlements are characterised by extreme bleakness. Three main factors account for this: obsolete housing and bad layout, industrial dereliction and absence of trees. The remedy for the first two is urban renewal and rehabilitation; and for the third, tree planting. It is therefore proposed that the urban settlements and their immediate surroundings be intensively and extensively planted with trees, to provide a framework of green within which the towns shelter. Neighbourhoods and recreation space should contain, and be contained by, woodland, and pedestrian ways should be routed through, or in the lee of this green framework.

There should be three types of planting:

- a Within the towns: the more ornamental large trees providing the main mass of planting, e.g. chestnut, lime, sycamore, plane, poplar, larch, Scots pine.
- b Within the towns: the ornamental smaller trees providing interest and variety, e.g. hawthorn, whitebeam, rowan, birch, crab.
- c Outside the towns: the large utilitarian trees providing shelter and a sense of definition, e.g. beech, oak, elm, sycamore, and the fast-growing poplars and conifers.

The towns most in need of such treatment are Armadale, Whitburn, Fauldhouse, Blackburn, Stoneyburn, Addiewell and West Calder.

Poor and non-agricultural land. It is proposed that extensive economic forest planting should be developed on suitable areas of non-productive, poor quality, agricultural land, and that these should be planned wherever possible as forest parks.

This is an extension of a similar proposal for landscape type 3 (lowland - poor - wooded). The benefits would be threefold: production of timber, improvement of adjacent agriculture and provision of public open space. There are two specific recommendations for land uses on this type; golf courses and cemeteries.

Golf Courses. It is proposed that golf courses be established on this type of land, because not only is this a good use of poor land, but with care could carry a greater sheep population per acre than at present. With reserve pasture for periods of intensive use (week-ends and summer evenings), sheep and golfers would seldom meet. Shelterbelt planting should be provided for both, and integrated with the regional walkway system. There is a potential demand for at least six new golf courses serving not only the Region but also Edinburgh.

Cemeteries. It is proposed that two new regional cemeteries be established on this type of land. The proposed cemeteries would lie in the country, surrounded by hills and trees, landscaped with the elements of trees, grass, water and flowers, to be comforting and beautiful places of rest.

5 Upland - poor - wooded

The uplands are the largest underdeveloped area in the Region, covering over one quarter of the Region. It is this type which is so admirably suited to the development of a county park system of recreational facility. This county park system can be designed to concentrate people where they will do least harm and these parks can be linked with 'unlimited access' areas where intensity of use can be kept low enough to have the same effect. These areas need to be developed to attract people to them. At present, they are inhospitable, bleak and windswept, and often shrouded in mist. The result of afforestation at Crosswood and Breich shows that it is possible to alter the physical environment dramatically by these means.

It is proposed that the Pentland Hills in general and the southern uplands of the Region in particular, be treated in a similar way to the National Parks for recreational and economic uses, to become within fifty years a major recreational area, forming a link in an inter-regional network of parks in Central Scotland and beyond.

6 Upland - poor - treeless

It is proposed that the marginal uplands (between 700 and 1,250 feet) be developed comprehensively in the interests of good land use and to meet the increasing demand for food and timber.

The key to this problem is a regional reclamation scheme, applied in a similar way to that of the Department of Agriculture's schemes at Strath Carron and Strath Oykell. Under private or Department ownership, the area is minutely surveyed for boundaries, roads, soil types, vegetation, fauna, drainage, slope, orientation, exposure and other climatic features. A plan is then prepared, making the best use of every element and incorporating all the facilities needed to operate it in the most efficient way. Pasture and arable land, shelterbelts and forests are disposed to their mutual and maximum advantage. All-weather roads would serve every farm and field, summer grazing areas above tree level, and forestry plantations.

Conclusion

The realisation of these proposals will occur as society is evolving and adjusting itself to new pressures and changing situations; the time scale involved in their realisation is such that, by the time of completion, they will be ready for numerous interests not yet considered.

Planning authorities have increasing difficulties in determining residential and industrial planning applications affecting rural areas; industrial-type farm buildings, commuters' timber houses in secluded spots, and new villages in old estates are examples of borderline cases.

It is suggested, therefore, that research be undertaken to evolve standards of density, and conditions for development, for different types of landscape. These standards would be based on the measurable factors of topography, woodland, land use, visibility and accessibility and would depend on a clear understanding of the present use of different land types and a policy of what the new activities should be.

SUMMARY

Survey

The study was based on the examination of three primary factors: Topography, Land Fertility and Woodlands. From the individual examination and the diagrammatic representation of these factors a 'Landscape Analysis' Map (Map 15.1) was produced which divided the entire Region into eight types of Landscape. The characteristics of the six types discussed in this Chapter are briefly described:

1 Lowland - fertile - wooded

The pastoral and arable with farmlands. Well sheltered with trees.

2 Lowland - fertile - treeless

Intensive farming on very good land. Few trees because of large fields and topographic shelter.

3 Lowland - poor - wooded

Shelterbelt farming: this is found on the poorer land on the lower hill slopes.

The country house estate: these estates are well-wooded, of high amenity value.

Natural regeneration and plantation woodland: this is found on uncultivable slopes, waste ground, and on some of the poorer ground of the estates.

4 Lowland - poor - treeless

Industry: the viable and derelict industrial sites are in this group.

Settlements: this group includes most of the towns and villages, which are in general badly provided with trees.

Poor and non-agricultural land: the marginal farms and abandoned industrial sites used for rough grazing are included in this group.

5 Upland - poor - wooded

Natural woodland: this group is found mainly sporadically on scrub where grazing is impeded.

Shelterbelt agriculture: there is very little of this group above 800 feet. The outstanding exception is at Crosswood Hill (1,000 feet), an example of early nineteenth century land reclamation.

Plantation woodland: the new pattern of uplands, including the larger type of coniferous forests being laid out by the Forestry Commission.

6 Upland - poor - treeless

Most of the southern uplands from eight hundred to over eighteen hundred feet are in this type, supporting sheep farming and including the water catchment areas.

Proposals

That a linear park system be established, following the main water drainage channels of the Almond Basin system, expanding and contracting along its length in conformity with the pressures of population and the availability of land.

1 Lowland - fertile - wooded

That with the exception of the Livingston Designated Area and the immediate environs of the expanding settlements, development of the 'fertile' types of landscape should be avoided wherever possible.

That a linked walkway system be established throughout the rural areas, taking advantage of rights of way, shelterbelts, disused railways, and other types of non-arable land, to connect all the urban settlements, parks, forests and 'unlimited access' areas.

That for the motoring public a system of car parks, picnic spots, and access areas be provided throughout the Region, using the rural road network and non-arable and derelict land.

That an exhibition farm be established, planned to attract, accommodate, entertain and educate large numbers of the public, especially school-children, in the ways of the countryside.

2 Lowland - fertile - treeless

That tree planting be undertaken throughout this landscape type to improve the micro-climate and amenity.

That a scheme be prepared, establishing in greater detail where planting should be, and consideration be given to methods of persuading owners and farmers to participate.

That the Union Canal and towpath be retained and improved as an essential part of the regional recreational facilities.

That extensive allotment areas be located within easy walking or motoring distance of Livingston and that they be provided with car parks and other services peculiar to gardeners.

3 Lowland - poor - wooded

That every effort be made to retain and improve woodlands so that they may be utilised in the urban and rural recreation network and may improve the micro-climate and amenities.

That the present system of shelterbelts be improved and replaced wherever necessary, and that new techniques of design, planting and management be used to make them economically viable.

That the well-wooded estates where possible retain their identity as single entities, and be preserved and developed as public open spaces, or for institutional use, or self-contained residential communities.

That natural regeneration be encouraged on derelict and non-arable land by fencing to exclude animals and by planting pioneer trees to assist further growth.

That Selm Muir forest be treated as a regional pilot study area for 'limited access' public open space.

That Calder Wood be used primarily as a park, planted both with economic and ornamental species, to provide the Forestry Commission with timber and the public with open space.

That a large caravan site and a motel be established in the north-east corner of the Region near Kirkliston and M9/A9 intersection, convenient to the Forth Road Bridge and Edinburgh.

4 Lowland - poor - treeless

That this type of landscape be used for urban and industrial development in preference to all others.

That the majority of the bings be landscaped, and that a co-ordinated programme of quarrying by contractors be implemented for the removal of the remainder, followed by similar removal of treated bings by controlled methods.

That the urban settlements and their immediate surroundings be given intensive and extensive tree planting treatment.

That extensive economic forest planting be developed in suitable areas of non-productive poor quality agricultural land, to be planned wherever possible as forest parks.

That, where practicable, golf courses be established on this type of land.

That two regional cemeteries might be established on this type of land, following natural landscape characteristics.

5 Upland - poor - wooded

That the Pentland Hills generally, and the southern uplands of the Region particularly, be treated in a similar way to the National Parks for recreational and economic uses.

That the marginal uplands (between 700 and 1250 feet) be developed comprehensively, in the interests of good land use.

In conclusion, it is suggested that a research project be set up to evolve standards of density and conditions for development for different types of landscape.

APPENDICES

Appendix A. CLIMATE

TABLE 2.1. AVERAGES OF RAINFALL FOR THE STANDARD 35-YEAR PERIOD 1916-1950

Monthly Rainfall in Inches

Locality	M.S.L. height (feet)	Total Rainfall	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	No. of Years Recorded
Grangemouth Park,	15	32.93	3.69	2.41	2.14	1.87	2.48	2.10	3.09	3.38	2.99	2.59	3.26	2.95	6
Dalmeny House, South Queensferry.	20	28.19	2.55	1.74	1.70	1.66	2.20	1.99	2.97	3.24	2.67	2.89	2.48	2.10	35
The Royal Botanic, Edinburgh.	74	26.89	2.38	1.71	1.55	1.57	2.19	1.90	2.75	2.96	2.52	2.75	2.53	2.08	31
Falkirk, Stirlingshire.	105	37.19	4.10	2.92	2.42	2.05	2.60	2.25	3.22	3.44	3.22	3.93	3.59	3.45	35
Turnhouse Airport, Edinburgh.	114	26.97	2.43	1.85	1.56	1.59	2.16	1.86	2.91	3.10	2.54	2.78	2.37	2.02	8
Davidson's Mains, Edinburgh.	200	28.13	2.53	1.83	1.63	1.66	2.25	2.00	2.93	3.14	2.62	2.90	2.45	2.19	20
Middletown Hall, Uphall.	350	33.84	3.43	2.38	2.10	2.06	2.46	2.20	3.13	3.49	3.13	3.56	3.11	2.79	35
Mid Calder.	400	33.11	3.37	2.25	2.09	2.02	2.42	2.12	3.15	3.21	3.08	3.40	3.05	2.95	10
Blackford Hill, Edinburgh.	441	27.53	2.45	1.68	1.60	1.62	2.21	1.88	3.03	3.15	2.55	2.83	2.42	2.11	35
Grange, Linlithgow.	450	32.43	3.22	2.23	2.05	1.79	2.60	2.15	3.16	3.36	2.82	3.41	2.91	2.73	35
Westwood, West Calder.	480	34.72	3.65	2.39	2.12	2.12	2.43	2.19	3.09	3.33	3.30	3.72	3.26	3.12	15

APPENDIX A
TABLE 2.1 (continued)

	M. S. L. height (feet)	Total Rainfall	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	No. of Years Recorded
Lochcote, Torphichen.	550	36.09	3.75	2.57	2.38	2.12	2.74	2.32	3.24	3.41	3.26	3.83	3.44	3.03	35
Penicuik, Midlothian.	620	37.32	3.66	2.57	2.35	2.20	2.76	2.46	3.62	3.78	3.40	3.84	3.40	3.28	14
Northbank Fulters, Bathgate.	840	38.91	4.12	2.72	2.41	2.33	2.79	2.48	3.57	3.76	3.69	4.07	3.57	3.30	40
Balerno, Midlothian.	700	37.09	3.67	2.49	2.30	2.30	2.74	2.37	3.63	3.71	3.45	3.83	3.37	3.23	25
Morton, Selin Muir.	749	38.45	3.89	2.65	2.38	2.38	2.77	2.46	3.54	3.73	3.68	3.97	3.56	3.46	40
Loganlea, West Calder.	811	38.59	3.78	2.62	2.39	2.35	2.85	2.51	3.74	3.99	3.55	3.97	3.48	3.36	41
Harperrig, Corston.	900	40.63	4.17	2.90	2.70	2.63	2.90	2.58	3.42	4.03	3.60	4.18	3.80	3.72	35
Crosswood.	950	40.62	4.18	2.84	2.44	2.52	2.80	2.58	3.61	3.90	3.86	4.35	3.82	3.74	40

TABLE 2.2 AVERAGES OF AIR TEMPERATURE ($^{\circ}\text{C}$) SURROUNDING THE REGION (YEARS 1931-1960)

The Royal Botanic, Edinburgh. (Weighted figures)		Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
(74 feet above mean sea level)														
Maximum (9-9)	12.5	6.1	7.0	9.0	11.8	14.5	17.8	19.2	18.7	16.7	13.0	9.4	7.2	
Minimum (9-9)	5.2	-0.1	0.6	1.8	3.7	6.1	9.1	11.1	10.8	8.9	6.1	2.8	1.5	
Mean	8.9	3.0	3.8	5.4	7.7	10.3	13.4	15.2	14.7	12.8	9.8	6.1	4.3	
Falkirk, Stirlingshire. (Weighted figures)														
(105 feet above mean sea level)														
Maximum (9-9)	12.6	5.8	6.7	9.1	12.2	15.6	18.6	19.8	19.3	16.9	13.0	9.1	7.0	
Minimum (9-9)	5.0	-0.3	0.3	1.7	3.6	5.7	8.8	10.9	10.7	8.6	5.8	2.8	1.3	
Mean	8.9	2.8	3.5	5.4	7.9	10.7	13.7	16.4	15.0	12.7	9.4	5.9	4.2	
Turnhouse Airport, Edinburgh. (Weighted figures)														
(114 feet above mean sea level)														
Maximum (9-9)	12.1	5.4	6.5	8.7	11.6	14.3	17.2	18.9	18.4	16.3	12.6	9.1	6.6	
Minimum (9-9)	4.9	0.1	0.3	1.7	3.1	5.7	8.6	10.7	10.2	8.4	5.9	2.9	1.7	
Mean	8.5	2.8	3.4	5.2	7.3	10.0	12.9	14.8	14.3	12.3	9.3	6.0	4.2	

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TABLE 2.3 AVERAGES OF BRIGHT SUNSHINE IN ADJACENT AREAS (YEARS 1931-80)

	Total hours	Jan.	Feb.	Mar.	Apr.	Hours per Month							Nov.	Dec.
						Jul.	Aug.	Sep.	Oct.	May	Jun.			
The Royal Botanic, Edinburgh. (74 feet + 56 feet)														
Total hours	1330	44	65	97	145	181	188	169	146	125	88	50	32	
Av. Mean	3.04	1.42	2.31	3.13	4.83	5.84	6.27	5.45	4.71	4.16	2.84	1.66	1.03	
Turnhouse Airport, Edinburgh. (114 feet + 39 feet) (Weighted to 1931-1960)														
Total hours	1315	47	71	101	142	181	183	159	135	119	87	54	36	
Av. Mean	3.60	1.52	2.53	3.25	4.73	5.84	8.10	5.13	4.35	3.96	2.81	1.80	1.16	
Liberton, Edinburgh. (200 feet + 10 feet) (Weighted to 1931-1960)														
Total hours	1320	57	78	110	141	166	172	151	146	124	95	54	26	
Av. Mean	3.61	1.84	2.78	3.55	4.70	5.35	5.72	4.86	4.71	4.13	3.06	1.80	0.84	
Davidson's Mains, Edinburgh. (200 feet + 30 feet) (Weighted to 1931-1960)														
Total hours	1293	47	71	101	142	174	175	151	135	117	87	54	39	
Av. Mean	3.54	1.52	2.53	3.25	4.73	5.61	5.83	4.86	4.35	3.90	2.81	1.80	1.25	
Blackford Hill, Edinburgh. (441 feet + 5/30 feet)														
Total hours	1384	54	76	111	146	181	188	162	143	126	96	57	44	
Av. Mean	3.79	1.74	2.71	3.57	4.86	5.84	6.27	5.22	4.61	4.20	3.09	1.90	1.42	

APPENDIX A

TABLE 2.3 (continued)

	Total hours	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Boghall, Midlothian. (639 feet + 5 feet)													
Total hours	1268	49	70	100	138	168	173	147	133	114	87	54	37
Av. Mean	3.47	1.58	2.50	3.22	4.53	5.41	5.76	4.74	4.29	3.80	2.81	1.80	1.19
Balerno, Midlothian. (700 feet + 20 feet) (Weighted to 1931-1960)													
Total hours	1314	46	69	101	140	183	187	158	139	115	88	51	37
Av. Mean	3.59	1.48	2.47	3.25	4.66	5.90	6.22	5.10	4.48	3.83	2.84	1.70	1.19

APPENDIX A

TABLE 2.4 AVERAGE OF SNOW-LYING DAYS AT 0900 HRS. G.M.T. IN AREAS SURROUNDING THE REGION

Locality	Altitude (feet)	Max. Depth (inches)	Total No. of Days	No. of Years recorded	Average No. of days/year.
The Royal Botanic, Edinburgh.	74	9	243	14	17
Turnhouse Airport, Edinburgh.	114	6	97	7	14
Stirling, Stirlingshire.	151	6	129	7	18
Liberton, Edinburgh.	200	7	154	7	22
Penicuik, Midlothian.	620	12	226	7	32
Carswath, Lanarkshire.	706	7	318	10	32
West Linton, Peeblesshire.	800	24	628	17	37

APPENDIX A

TABLE 2.5 NUMBER OF DAYS OF SNOW AND SLEET RECORDED AT
TURNHOUSE AIRPORT, EDINBURGH (YEARS 1949-1963)

Year	Number of Days												
	Total	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1949	15	2	2	4	1	0	0	0	0	0	0	1	5
1950	26	3	5	2	3	1	0	0	0	0	0	3	9
1951	38	8	8	10	7	0	0	0	0	0	0	0	5
1952	19	15	0	1	0	0	0	0	0	0	0	0	3
1953	11	2	7	0	1	0	0	0	0	0	0	0	1
1954	22	5	7	3	1	1	0	0	0	0	0	2	3
1955	39	7	14	8	0	3	0	0	0	0	1	0	6
1956	35	8	14	4	1	1	0	0	0	0	0	3	4
1957	20	7	7	1	0	0	0	0	0	0	0	1	4
1958	39	9	8	13	2	0	0	0	0	0	0	0	7
1959	13	7	1	1	0	0	0	0	0	0	1	2	1
1960	23	9	10	2	0	0	0	0	0	0	0	0	2
1961	25	5	4	2	1	0	0	0	0	0	0	3	10
1962	32	3	8	6	4	0	0	0	0	0	0	2	9
1963	43	17	16	0	1	0	0	0	0	0	0	4	5

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TABLE 2.6 NUMBER OF DAYS (0900 HRS., G.M.T.) WHEN FOG AT
TURNHOUSE AIRPORT REDUCED VISIBILITY TO LESS THAN
1,100 YARDS

Year	Total	Number of Days											
		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1949	9	0	2	2	0	0	0	0	2	2	1	0	0
1950	14	3	3	2	0	0	0	0	0	0	1	2	3
1951	12	3	2	1	0	3	0	0	0	1	1	1	0
1952	10	3	1	0	1	1	0	0	0	0	0	2	2
1953	13	2	0	3	0	0	0	0	0	0	2	0	6
1954	9	1	5	2	0	1	0	0	0	0	0	0	0
1955	10	3	3	1	1	0	0	0	0	0	0	1	1
1956	12	3	1	1	0	0	0	1	0	4	1	0	1
1957	7	1	1	1	0	1	1	0	2	0	0	0	0
1958	14	0	3	0	0	0	3	1	1	1	0	4	1
1959	17	1	7	2	0	0	1	0	0	0	2	3	1
1960	9	1	1	0	0	0	0	0	0	0	0	2	5
1961	10	1	1	0	1	0	0	0	0	0	0	4	3
1962	10	2	0	0	0	0	0	1	0	1	4	1	1
1963	13	2	1	2	0	0	2	1	0	0	2	2	1
Total	169	26	31	17	3	6	7	4	5	9	14	22	25

APPENDIX A

TABLE 2.7 EDINBURGH'S MONTHLY WIND CHART SHOWING WIND
PERCENTAGES BLOWING FROM A PARTICULAR DIRECTION

Direction	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year	Direction
North	2	4	4	7	6	5	2	3	4	4	4	2	4	North
N.E.	3	4	7	13	22	17	9	7	6	3	4	4	8	N.E.
E.	5	9	11	10	14	10	7	5	5	4	6	7	8	E.
S.E.	6	8	10	8	7	7	5	5	4	5	8	9	7	S.E.
S.	16	9	9	9	10	9	10	9	10	10	11	13	11	S.
S.W.	25	19	12	11	8	13	15	16	18	24	21	19	17	S.W.
W.	26	26	23	22	13	21	31	32	26	31	23	27	25	W.
N.W.	4	5	6	8	7	8	8	6	8	6	5	4	6	N.W.
Calm	13	16	17	12	13	9	12	17	18	12	16	14	14	Calm

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TABLE 2.8 NUMBER OF DAYS AT TURNHOUSE AIRPORT WHEN WINDS OF
GALE FORCE 8 OR MORE WERE RECORDED

Year	Number of Days												
	Total	J	F	M	A	M	J	J	A	S	O	N	D
1949	18	6	4	2	2	0	1	0	1	0	1	0	1
1950	7	0	2	0	0	1	0	0	0	1	2	1	0
1951	7	0	1	0	2	0	0	0	0	0	0	0	4
1952	11	3	1	0	0	0	0	0	1	2	3	0	1
1953	8	3	1	0	2	0	0	0	0	1	0	1	0
1954	23	6	2	0	0	0	0	0	0	0	2	6	7
1955	12	1	2	1	0	1	1	0	0	0	0	0	6
1956	14	3	0	2	0	0	1	0	1	1	0	2	4
1957	20	8	2	1	1	0	0	0	1	1	3	1	3
1958	10	2	2	1	0	2	0	0	0	1	1	0	1
1959	11	1	4	0	0	0	1	0	0	0	0	2	3
1960	7	0	2	0	2	0	1	0	0	0	0	1	1
1961	13	2	3	2	0	0	1	1	1	2	1	0	0
1962	17	5	4	0	1	2	1	0	1	0	0	0	3
1963	9	1	0	2	1	0	0	0	0	1	2	1	1

APPENDIX A

TABLE 2.9 GROUND AND AIR FROST READINGS AT TURNHOUSE
AIRPORT, EDINBURGH

Year	Type	Number of Days												
		Total	J	F	M	A	M	J	J	A	S	O	N	D
1949	Grd.	71	0	9	15	8	5	2	0	0	0	6	14	12
1950	Grd.	136	14	17	15	12	4	0	0	0	0	7	20	27
1951	Grd.	116	19	21	19	11	10	3	0	0	1	6	8	18
1952	Grd.	136	24	21	14	14	4	3	0	0	4	12	21	19
1953	Grd.	106	17	16	19	14	5	1	0	0	0	10	8	16
1954	Grd.	116	21	20	14	19	2	1	1	1	9	4	14	10
1955	Grd.	127	17	25	23	12	12	2	0	1	1	13	8	13
1956	Grd.	116	21	20	10	20	7	4	0	5	1	6	16	6
	Air	77	18	21	7	11	3	0	0	0	0	3	8	6
1957	Grd.	114	17	18	7	14	10	6	0	0	4	10	13	15
	Air	60	15	15	3	4	1	0	0	0	1	0	9	12
1958	Grd.	113	23	13	20	11	10	0	1	0	1	4	16	14
	Air	77	18	13	17	7	3	0	0	0	0	1	6	12
1959	Grd.	80	26	11	8	11	5	0	0	0	1	1	7	10
	Air	17	1	7	2	0	0	1	0	0	0	2	3	1
1960	Grd.	93	15	20	5	7	4	0	0	0	2	4	16	20
	Air	75	18	21	6	2	1	0	0	0	0	2	10	15
1961	Grd.	119	21	14	7	9	8	5	2	1	0	9	17	26
	Air	66	18	8	3	4	1	0	0	0	0	0	10	22
1962	Grd.	152	22	19	24	16	7	5	2	2	4	9	16	26
	Air	73	9	7	16	7	0	1	0	0	0	3	11	17
1963	Grd.	121	26	28	14	8	8	0	0	0	1	6	12	18
	Air	76	22	25	5	1	0	0	0	0	0	2	8	13

Appendix B. BUILDINGS OF ARCHITECTURAL AND HISTORIC INTEREST, ANCIENT MONUMENTS, AND FLORAL SPECIES

TABLE 3.1 BUILDINGS OF ARCHITECTURAL & HISTORIC INTEREST
LIVINGSTON NEW TOWN

Scottish Development Department - List of Buildings of Architectural or Historic Interest. April 1963. Provisional List.

Name of Building	Type, Date, Architect, etc.	Category	
1. Livingston Village, Livingston Parish Kirk	1732. Plain Georgian. Oblong. Rubble. Gabled. Skews. Slated roof. 'Bird-cage' belfry (with louvres) at W. end: coupled chimneys at E. Round-headed windows. Interior: lofts (formerly having fore-stair on N) at ends. Pews and Gothic Revival pulpit installed 1837.	B	Ecclesiastical, in use as such, Parish included Whitburn until 1731. In burial ground which has interesting head-stones. B group with items 3 - 6.
2. Livingston Manse	1803. Traditional, 2 storeys. Rubble. Gabled. Skews. Slated roof. Gabled projecting bay at front. 1-storey lean-to and gabled offices at rear.	B	
3. Houses	18th century. Traditional. 2 storeys. Rubble: lime-washed at W. end ('Old School House') Gabled. Skews. Slated roof.	B for group value	5 properties.
4. Bloom Cottage	19th century. Traditional. 1 storey. Rubble, Gabled. Slated roof.	B for group value	Abuts on houses (item 3).
5. Livingston Inn	18th century. Traditional. Inn: 2 storeys. Rubble. Gabled. Skews. Slated roof. Ground floor windows altered. Piended porch at E. end. Gabled wing at rear. Interior: Original cornices, fire-places, etc. Stables and Coach-houses: L-plan. 1 storey and loft. Rubble. Gabled. Skews. Pantiled roof. Elliptical arches.	B	Formerly a coaching inn on Edinburgh Glasgow Turnpike.
6. Old house	18th century. Traditional. 2 storeys. Rubble. Gabled. Skews. Roofless. Moulded eaves course.	C	Derelict.

Name of Building	Type, Date, Architect, etc.	Category	
7. Livingston Bridge, River Almond	18th century. Segmental arch. Rubble. Slab cope to parapet wall.	B	S. half is in Mid Calder Parish (Midlothian).
8. Old Toll-house, Long Livingston	Later 18th century. Plain Georgian. 1 storey and attics. Rubble. Pedimented front; inset. Slated roof.	B	Built on Edinburgh Glasgow Turnpike. Near site of old tavern, "The High House of Livingston" kept by "The Bonny Lass o' Livingston".
9. Barracks Farmhouse and Steading	Grouped around a yard. House: 19th century. Plain Victorian. 2 storeys. Modern rough-cast. Gabled. Slated roof. Dressed stone chimneys. Gabled porch. Steading: 18th century. Traditional. 1 storey and loft. Rubble. Gabled. Skews. Pantiled roof, partly piended. Fore-stairs. Piended addition in yard.		
10. Monument, near Dechmont House	Dated 1866. Dressed stone Tall 'Gothick' pier; niches with figures; pillars; heads at top. Octagonal stepped; risers incised with date; initials 'L.M.', and ornaments.	C	Dechmont House is modern but there have been earlier mansions on or near the site.
11. Knightsridge House	c.1800. Georgian. 2 storeys and basement; 3 windows wide. Coursers. Piended slated roof. Central chimney. Cornice and blocking course. Corniced ground floor windows. Pedimented portico; square piers.	B	Perhaps built for Thomas Shairp of Houston.
12. Moss Houses	18th(?) century cottages. Traditional. 1 storey. Rubble. Gabled. Pantiled roof. Lying-panes. Small gabled addition at S. end.	B	3 properties.
13. Newyearfield Farmhouse and Steading	Grouped around a yard. 18th century. Traditional House: L-plan. 2 storeys. Rubble, partly harled. Gabled. Skews. Pantiled roof. Steading: 1 storey and loft. Rubble, partly lime-washed. Gabled. Pantiled and slated roofs, partly piended.	B	Nearby until c. 1790 stood a Keep used by Kings as a hunting-lodge. Water of Spring-well was remedy for 'the King's evil'.

Name of Building	Type, Date, Architect, etc.	Category	
14. Blackburn House	Later(?) 18th century. Georgian. House: 2 storeys with basement and attics at rear. 5 windows wide. Coursed rubble. Piended slated roof. Corner stone. Projecting central pavilion; portico, distyle in antis. 2 polygonal projecting bays at rear. Interior: original 6-panelled doors and other wood finishings; plaster relief decoration. Offices: 2 storeys. Random rubble. Piended slated roofs. Linked by quadrant walls to House.	B	Perhaps built for George Moncrieff of Blackburn, agricultural improver.
15. Blackburn village Bridge, River Almond	Dated 1774. 2 segmental arches. Stugged ashlar. Angle buttresses on each end of pier; insed (incised with date) over W. one. Parapets or rock-faced stone-work.	B	Partly in Whitburn parish.

KIRKLISTON

Scottish Development Department - List of Buildings of Architectural or Historic Interest. February, 1964. Provisional List.

Name of Building	Type, Date, Architect, etc.	Category	
1. Maitland's Bridge, River Almond	Later 19th cent. 3 segmental arches. Rubble.	B	Replaced wooden footbridge (built 1846 to give access to Ratho Station). Probably named after Sir Alexander Charles Gibson Maitland of Clifton, 3rd Bt. Partly in W. Lothian.
2. Ingliston House	1846 - Brown & Wardrop, Edinburgh. Scots Baronial. 2 storeys (with garret) on basement. Ashlar. Corbie-step-gabled. Angle turrets. Inset over entrance.	B	Built for William Mitchell Innes of Bangour, West Lothian, who had acquired estate from Sir James Gibson Craig of Riccarton 1st Bt., 1844. Now owned by Royal Highland and Agricultural Society.
3. West Mains of Ingliston Farmhouse	Late 18th cent. Trad. Long block, 2 storeys. Harled. Skew-gabled. Slated roof.	C	
4. Clifton Hall	1850. David Bryce, Scots Baronial. Rambling. 2½ storeys. Ashlar. Corbie-step gables. Slated roof. Angle turrets. High round tower at N. angle. Stair to entrance on 1st storey. Bay-windows at rear.	C	Built for Sir Alexander Charles Gibson Maitland of Clifton, 3rd Bt., M.P. Sold to Robert Bell c.1880, oil and coal owner. A residential school since c.1930.
5. Doocot, at Clifton Hall	1812. Octagonal. Ashlar. Oculi.	B	Built for Sir Alexander Charles Maitland, 2nd Bt., who had married Helen Gibson, heiress to Clifton.
6. East Lodge, Clifton Hall policies	Earlier 19th cent. 'Gothick'. 1 storey. Coursers. Piended slated roof. Corner stone. Pointed latticed windows.	C	
7. Bridge 16 Union Canal	c.1820. Semi-circular arch. Coursers. Number on Keystones. Railings between parapet walls.	C	

Name of Building	Type, Date, Architect, etc.	Category	
8. Bridge 17 Union Canal	c. 1820. Similar to 16 but with higher arch and parapet railings of alternate straight and twisted posts.	C	
9. Bridge 18 Union Canal	c. 1820. Similar to 16 but segmental-arched.	C	
10. Union Canal Aqueduct, River Almond at Lin's Mill	c. 1820. 5 semi-circular arches. Coursers; dressed voussoirs; rock-faced piers. Iron parapet railings.	A	Partly in West Lothian
11. Lin's Mill and Cottages	Mill. 17th cent. Trad. 2 storeys and basement. Rubble. Piended pantiled roof. Cottages: Later. Two. At right angles to Mill. 1 storey and garret. Laigh floor. Rubble. Corbie-stepped gables. Pantiled and slated roofs. Piended dormers. Fore-stair.	C	Nearby is grave of Lin (d. 1645) last man in Scotland to die of plague.
12. Railway Viaduct, Almond Valley	1842. 36 high arches Rock-faced coursers. Dressed parapet.	A	Mostly in West Lothian. A splendid achievement in engineering. Built for North British Railway.
13. New Bridge, River Almond	18th cent. 2 segmental arches. Coursed rubble. Slab coping. Corbelled string course. Moulding following arch. Voussoirs alternately projecting. Rounded cut-waters (oculi over).	B	Partly in West Lothian on Edinburgh-Bathgate road.
14. Newbridge Inn	Dated 1683 and 1895. Trad. 2 storeys. Rendered. Gabled corbie-steps (renewed). Slated roof. Moulded door-architrave (date 1683 over). Short wing to street (date 1895 in gable).	C	

BATHGATE

Scottish Development Department - List of Buildings of Architectural or Historic Interest. March, 1963. Provisional List.

Name of Building	Type, Date, Architect, etc.	Category	
1. 45-47 High Street	18th(?) century. Traditional. 1 storey and attic. Rendered front; harled ends and rear. Gabled. Pantiled roof. Skews and corbie-steps. 3 gabled dormers.	B	2 properties
2. 9 Brown Square	Dated 1789. Traditional. Small. Rendered front; harled rear. Gabled. Corbie-steps. Pantiled roof. Inset, incised 'D.M./J.H./1789' over door.	B	
3. 30 Main Street	18th (?) century. Traditional. Rendered. Gabled. Corbie-steps. Pantiled. Classical doorway: pilasters; architrave; cornice.	B	
4. 18 Main Street and 1 Market Street	18th(?) century. Traditional. Harled. Gabled. Corbie-steps and pantiles at 18 Main St; skews and pantiles at 1 Market Street. Much altered.	C	
5. Simpson Memorial Mission Hall	c. 1800(?). Traditional. 2 storeys. Harled. Gabled. Skews. Slated roof. Upper floor windows altered. Lean-to at rear.	C	Sir James Young Simpson, discoverer of Chloroform as an anaesthetic, born here 1811. Now used by Salvation Army.
6. Balbardie House	1793. Robert Adam. Georgian. House: Formerly consisted of central corps de logis; wings; end pavilions. E. half has been demolished. W. pavilion: 2 storeys. Ashlar. Piended slated roof. Eaves blocking course. Moulded window architraves (with balustrades below) at upper floor. Windows in round-arched recesses at lower floor. Wing: Platform roof. Entrance in apsidal recess; open screen of 2 columns; lintel ornamented with swag and surmounted by urn. Corps de logis: Fragment of W. end; 2 storey and attic. Pilastered upper floor; rusticated lower floor. Interior much altered. Offices: At W. end of W. Pavilion. 1 storey. Semi-circular end. Harled. Lean-to roofs behind	B	Built for Alexander Marjoribanks of that ilk, Superiors of Bathgate Burgh of Barony. Once surrounded by beautiful park.

Name of Building	Type, Date, Architect, etc.	Category	
6. Balbardie House (continued)	enclosing wall. 2 small open courts.		
7. Bathgate Academy	1831-3. R. & R. Dickson, Edinburgh. Greek revival. Doric. Ashlar. Central block: Distyle in antis. Clock tower over (flanked by horizontal consoles) capped by open belfry; pinnled slated roof behind. Linked by loggias (balustraded parapets; platform roofs) to 2 pedimented and pilastered pavilions. Low offices at ends. Very broad flight of steps in front. Additions at rear of pavilions and in similar style.	A	Built from bequest (1799) of John Newland, a native of Bathgate, who made fortune in Jamaica.
8. Bathgate Old Parish Kirk, Kirkton	Mediaeval. Oblong. Narrow. Rubble; somewhat dilapidated. W. gable remains. Roofless. Wide doorway on N. Grass-grown floor. Grave-slabs to Andrew Crichton of Drumcorse, etc. Mural tablets to Marjoribanks of that Ilk. etc.	C	Ruin. Abandoned 1739 when parish kirk (replaced 1862 by High Church on same site) was built on Main St. In ancient burial ground which has grave of James Davie, Covenanter, killed 1673.
9. Kirkton Park Gate-way	19th century. 'Gothick'. Dressed stone. High pointed arch flanked by 2 lower ones. Crenellation; pinnacles; cross over central arch. Modern iron gates (1953).	C	Built as gate-way to Kirkton House (1599; now demolished). Gates presented by Stewart Society to commemorate Bathgate's association with House of Stewart.

WHITBURN

Scottish Development Department - List of Buildings of Architectural or Historic Interest. April, 1963. Provisional List.

Name of Building	Type, Date, Architect, etc.	Category	
1. Blackburn Village, Bridge, River Almond	Dated 1774. 2 segmental arches. Stugged ashlar. Angle buttresses on each end of central pier; inset, (incised with date) over W. one. Parapets of rock-faced stone-work.	B	Partly in Livingston Parish.
2. East Whitburn House	Earlier 19th century. Plain Georgian. 2 storeys. Coursers. Gabled. Skews. Slated roof. Pilastered doorway with entablature.	C	

WEST CALDER

Scottish Development Department - List of Buildings of Architectural or Historic Interest. May, 1964. Provisional List.

Name of Building	Type, Date, Architect, etc.	Category	
1. Old West Calder Kirk	Dated 1643. Oblong. Coursed rubble; overgrown. Gabled, with belfry at W. end. Roofless Buttresses. Round-Leaved windows and doorways. Date at W. end. Interior: grass-grown floor.	B	Ruin. West Calder was finally dis-joined from Mid Calder 1646. Kirk served Parish until 1880 when it was replaced by new one. Roof removed soon afterwards.
2. Harwood Farmhouse	1768. Trad. 2½ storeys; 3-bay front. Random rubble. Skew-gabled. Slated roof. Moulded door-architrave. Piended 1-storey offices at ends.	B	Belonged to Sir Henry Jardine c. 1840
3. Hartwood House	1807. Georgian (Subsequently altered and extended). 2 storeys. Harled. Skew-gabled. Slated roof. Dressed chimneys. Corner stones. Central pedimented bay flanked by later corbie-stepped projections and faced by modern brick porch.	C	Built for a Mowbray.
4. Harburn House, (Hayfield)	1804. Georgian. 2 storeys and garret; 5-bay front. Polished ashlar. Piended slated roof (platformed on top) behind blocking course. Piended dormers. Muted cornice. String courses. Porch with engaged columns approached by stair. 2 bow windows and large floor at rear.	B	Built for Alexander Young, 1st of Harburn (1757-1842).
5. Charles X Monument, Harburn policies	Erected c. 1835?. Column of dressed stone with ball-finial. Inscription on base.	B	Commemorates last visit of Charles X of France to Harburn, 3rd. Sept. 1832.
6. Harburn Stables	Earlier 19th cent. 'Square' 1 storey and loft. Rubble, lime-washed. Piended slated roof. Elliptical arch to pend. Fore-stair in yard.	B	

Name of Building	Type, Date, Architect, etc.	Category	
7. Harbun Dooocot	Earlier 19th(?) cent. 'Gothick'. Square, 2 storeys. Ashlar. Crenellated parapet. Pointed windows, doorway and blind arches. Interior: 297 nests.	B	
8. Hermand House	1797. Georgian. 3 storeys on basement 5-bay front of polished ashlar. Piended slated roof (platformed on top) behind blocking course. Wide pedimented doorway with 4 pilasters and 2 side-lights.	B	Built for George Fergusson (son of Sir James Fergusson of Kilkerran, Ayrshire, 2nd Bt.) who was appointed Judge of Court of Session 1799 with title of Lord Hermand.
9. Hermand Coachhouse and Stables	Coach-house: Earlier 19th cent. Plain Georgian. 2 storeys. Rubble. Piended slated roof. Central 3-storey pedimented pavilion with semi-circular arch. Kennels added to E. end. Stables in rear: Dated 1879. 3 arms around a yard.	B	
10. Limefield House	1804. Georgian. 2 storeys (with garret) on basement. Polished ashlar. Piended slated roof, platformed on top. 5-bay front; central 3 projecting and pedimented, with good doorway (fan-light, side-lights, framed by entablature and engaged columns) approached by stair.	B	Belonged to Thomas Gloag c. 1840.
11. Bridge I, near Limefield House	19th cent. Narrow segmental arch. Coursers. Slab coping.	C	
12. Bridge II, Limefield Glen	19th cent. Wide segmental arch. Random rubble. Slab coping. Round-arched passage at S. end.	C	
13. Gavieside Farmhouse	1730. Plain square house. 2 storeys. Harled. Piended slated roof platformed on top. Piended wing on N. side.	B	Belonged to John Davie Morton c. 1840.
14. Addiewell Farm	Dated 1762. 2-storey house now used as barn. Random rubble. Corbie-step-gabled. Slated roof. Roll-moulding to door-architrave. Date in lintel. Byre at W. end: 1-storey. Pantiled.	C	

Name of Building	Type, Date, Architect, etc.	Category	
15. Loganlea House (Muirisdykes)	Dated 1798. Trad. and Georgian. 2 storeys. 3-bay front: central bay projecting, with chimney gablet. Random rubble. Skew-gabled. Slated roof. Roll-moulding to door-architrave. Date in lintel. Rendered rear with another door of similar type. Harled ends.	B	Belonged to Rev. James Logan c. 1840.
16. Loganlea Doocot	18th cent. Oblong. Random rubble. (Cracks in walls). Lean-to roof, slated. String-course. 8 flight-holes. Interior: 2 storeys; 380 nest-holes (approx.).	C	

MID CALDER

Scottish Development Department - List of Buildings of Architectural or Historic Interest. August, 1963 Provisional List.

Name of Building	Type, Date, Architect, etc.	Category	
Midcalder Village	c. 1530-c. 1550. Gothic. Ashlar. Slated Roofs. Chancel and Apse: Moulded eaves course; string course. Massive buttresses. Pointed traceried windows. Round arched moulded doorway. Vestry at E. end; Lean-to roof. Ornamented pinnacles. Rectangular window. Sandilands Burial vault below. Transepts and Belfry added 1863 (Brown and Wardrop, Architects) to W. end. Bell dated 1663; re-cast 1876. Interior of Chancel and Apse much altered by plaster 'vaults'. Carved wooden pew-back dated 1595.	A	In ecclesiastical use. Rebuilt on site of earlier Kirk for rector Peter Sandilands and from 1541 for Sir James Sandilands, Lord St. John. Transepts on site of Old Schoolhouse. B Group.
1. Mid Calder Parish Kirk (St. John's Church) Main Street			
2. Bowery House, 70 Main Street	18th century. Traditional. 2 storeys and garret: 3 bays. Coursed rubble. Skew-gables. Slated roof. Scrolled skew-putts. Moulded eaves course and door architrave (corniced).	B	
3. 68 Main Street	18th century. Traditional cottage. 1 storey. Rubble: thinly rendered. Piended tiled roof.	B for group value	Adjoins Bowery House.
4. 35 Bank Street	Late 18th century. Trad. 2 storeys. Harled. Skew-gabled. 3 doors.	B for group value	Renovated.
5. Bank Street	Later 18th century. Traditional. 2 storeys. Rubble: lime-washed on S. side; harled on N. Gabled. Slated roof. Rounded W. end.	B	3 or 4 properties including Main Point.
6. Torphichen Arms Hotel, Bank Street	Later 18th century. Traditional. 2 storeys. Harled. Skew-gabled. Slated roof. 1 storey bay window (later). Two-way fore-stair at rear.	B	B group Former posting-house on turnpike road to Glasgow and Ayr.
7. East Bridge, Linthouse Water East Calder Road	1794. 2 high segmental arches. Coursed rubble. Rockfaced voussoirs. Spandrel pierced by oculus; cut-waters at pier; long approach walls on arches.	B	Half in Kirknewton Parish.

Name of Building	Type, Date, Architect, etc.	Category	
8. House, Pumpherston Road	18th century. Traditional. 2 storeys. Harled skew-gabled. Slated roof. Moulded door architrave. 1-storey-and-loft piended offices at N.W. corner; segmental archway to road.	B	
9. "Almondvale", Bridge End	18th century. Traditional. 2 storeys; 3 bays. Harled. Skew-gabled. Slated roof. Ground floor windows altered. 1-storey additions at both ends.	C	
10. Gate-lodge and gate-way, Calder Estate, Main Street	Mid(?) 19th century. Lodge Rustic style $1\frac{1}{2}$ storeys. Rubble. Gabled. Slated roof. Carved barge-boards. 1 storey bay window. Gate-way; dressed stone piers. Ball-finials. Die-wall with open upper part.	C	Derelict. Built as entrance to Avenue (which crossed West Calder Road by Viaduct, now demolished) leading to Calder House.
11. Calder House	16th-17th century mansion incorporating walls of earlier fortalice. Traditional. L-plan. 3 storeys (with laigh floors to N.) and garret. Random rubble. Gabled. slated roofs. Main Block: Corbie-steps and buttress at W. end; skews oculi, corner stones at extension to E. Rusticated chimney-heads. North wing: 4 storeys and laigh floor. Extended in later 17th century with skews etc. at gable end. Additions: Built c. 1780 and in 1880. In re-entrant angle and on W. side of Wing. Interior: Greatly altered. 3 contiguous vaulted chambers in older part of 1st storey of main block; Drawing Room (Great Hall) in floor above has pine panelling and tall windows. Kitchen and fine scale-and-platt stair in Wing.	A	Seat of Lord Torphichen. Barony of Calder has been held by Sandilands family since c. 1350. In Great Hall, in 1558 Knox openly celebrated the Reformed Communion for first time.
12. Gateway, Calder Estate, West Calder Road	Dated 1670. Renaissance. Dressed stone gate-piers (alternate courses hammer-dressed). Upper parts form broken pediment. Ball-finials. Ornamented	A	Built for Walter, 6th Baron Torphichen.

Name of Building	Type, Date, Architect, etc.	Category	
12. Gateway, (continued)	frieze with date. Return walls with ball-finials. Cast-iron gates.		
13. Linhouse	Dated 1589. 2 square towers attached at one corner only. Traditional. 3 storeys and garret. Rubble. Corbie-step gabled. Slated roof. Corbelled turret (in N.E. re-entrant angle) with conical stone roof, ball-finial, lucarnes; crenellated platform behind. Lintel inscribed '1589 NISI DOMINUS FRUSTRA' over old entrance (now window). L-planned addition to E. of S. tower (forming 3 sides of a yard) built in similar style c. 1690. Interior: vaulted basement in N. tower. Fine scale-and-platt stair in addition. Several good rooms.	A	Built for James Tennent of Linhouse. In 1631 passed to Muirheads for whom addition was built. Sold to Calderwoods of Polton 1767.
14. Doocot, Linhouse Park	Earlier 18th century. Oblong. Rubble. Corbie-stepped. Lean-to roof. 2 circular openings (with landing ledges) over doors. String-course forms additional ledge under 12 flight-holes. Interior: 2 chambers. 768 nest-holes.	B	Modern sheds abut on it.
15. Camilty Bridge, Camilty Water	Dated 1830. J. Tay, Engineer. High segmental arch. Rubble; somewhat dilapidated. Rounded coping to parapet walls. Keystone inscribed 'Built by J. Tay 1830'.	C	Half of Kirmewton Parish. Built for Alexander Young at Harburn, West Calder as part of proposed road to and across Cauldstane Slap.
16. Cairns Castle, Easter Cairns, by Harperrig Reservoir	c. 1440. Oblong Keep with Wing (of which little is left). 3 storeys. Rubble. Roofless. Lintelled windows. Interior: vaulted ground floor.	B	Not in good state of repair. Built for George Crichton Earl of Caithness, Lord High Admiral. Seat of Tennents of Cairns from 1542 until 1708.
17. Murieston Castle, Wester Murieston	16th century. Keep rebuilt and drastically restored 1824 to make a picturesque ruin. Oblong. 2 storeys. Random rubble. Roofless circular turret on wall-head. Water-spouts. Pointed windows. Fore-stair to upper storey.	B	Restored for John Keir who bought Wester Murieston in 1819.

Name of Building	Type, Date, Architect, etc.	Category	
17. Murieston Castle (continued)	Double doorway (inset inscribed 'I. K. / A. A. B. / 1824' bearing medallion with arms in spandrel). On ground floor, interior gutted with earthen floor.		
18. Westfield House	c. 1760. Georgian 2 storeys; 5 bays. Harled. Skew-gabled. Slated roof. Pilastered porch. 2 gabled wings projecting forward added later.	B	Perhaps built for John West of Westfield (originally Dyke) Commissioner of Customs. Acquired 1825 by John Keir of Westar Murieston and in 1884 by Dr. Robert Young who discovered the method for extracting paraffin oil from coal.
19. Alderston House (with offices)	17th-18th century. Traditional. Harled. Gabled. Slated roof. Main block: dated 1626. 2½ storeys. Corbie-steps. Aumbry corbelled out on N.E. gable. 2 gabled dormers (later). Date over old entrance reached by modern vestibule. Rear wing: 18th century 3 storeys. Skews. Band-courses. Long late addition at S.E. end. Interior: Vaulted kitchen in ground floor of main block. Offices: 18th(?) century. 1 storey. Piended.	A	Built for Patrick Kinloch, advocate. Seat of Kinlochs until 1692.
20. Doocot, Alderston Park	Later 17th century. Oblong. Harled. Corbie-stepped. (Formerly had lean-to roof). Ball-finials. Landing-ledge under 11 flight holes. Interior: 803 nest-holes.	B	
21. Livingston Bridge, River Almond	18th century segmental arch. Rubble. Slab coping to parapet wall.	B	Half in Livingston Parish, West Lothian.
22. Howden House	Later 18th century. Georgian. Main block: 3 storeys; 5 bays; skew-gabled; Moulded eaves course; Ionic distyle porch; Palladian window at rear. Wings: 2 storeys; piended. Harled. Slated roofs. Additions at rear.	B	Probably built for Thomas Farquharson of Howden. Passed to Henry Raeburn, son of the famous portrait painter, in 1834.

Name of Building	Type, Date, Architect, etc.	Category	
23. Howden Bridge	1764. 2 segmental arches (S. one larger). Rubble. Dressed parapet walls (slab coping) and voussoirs. Cut-waters at pier.	B	
24. Craigs Farm	Later 18th century. Farm-house: 2 storeys. Rubble, harled at rear and W. end. Skew-gabled. Slated roof. Steading: Around yard at rear. 1 storey and loft. Rubble. Pantiled roof.	C	
25. Letham Well, Letham Farm	c. 1780. Dressed stone; much dilapidated. Formerly pyramidal.	C	Built for Dr. John Lamont, surgeon and physician in Mid Calder. He believed the sulphureous water to be beneficial in cure of certain ailments.
26. Old Manse near Raw Toll	1807. Plain Georgian. 2 storeys and garret. Rubble. Skew-gabled. Slated roof. Flat-roofed dormers (Modern). Band-courses. Lower extension (1863) to S.W. and modern platform-roofed addition in front.	C	No longer the Manse.
27. Williamston Bridge	1647-8 but probably since rebuilt. Segmental arch. Coursers. Splayed copes to parapet walls (curved outwards at S. end).	C	
28. Bankton House	1812. Plain Georgian. 2 storeys and garret. Coursed rubble. Piended slated roof, platformed on top. Dressed stone chimneys. Flat-roofed dormers (later). Distyle porch. Piended 1-storey offices.	B	Built for James Bruce of Bankton (originally Cockrig) Secretary of Excise.
29. Murieston House, Easter Murieston	c. 1800. Georgian. 2 storeys. 5 bays; central bay forming pedimented pavilion. Ashlar. Piended slated roof. Cornice. Pilastered doorway. Gabled addition (1855) at rear with ridge parallel to ridge of older block.	B	Built for Henry Jamieson of Murieston, banker in Edinburgh.
30. Skivo Farm (Skivokennels)	Later 18th century. Traditional. 1 storey cottage with 1-storey-and-loft byres forming 3 sides of a yard. Random rubble.	C	

Name of Building	Type, Date, Architect, etc.	Category
30 Skivo Farm (continued)	Skew-gabled. Slated cottage. Tiled byres. Fore-stair at end of N. Byre.	

KIRKNEWTON

Scottish Development Department - List of Buildings of Architectural or
Historic Interest. November, 1963. Provisional List.

Name of Building	Type, Date, Architect, etc.	Category	
Kirknewton Village			
1. 'Sawmill House', 5 Whittemoss Road	18th cent. Trad. 2 storeys. Rubble. Skew-gabled. Pantiled roof.	C	
2. 26, 28, 30, 32 34 Main St.	18th and 19th cents. Trad. Row of five 1-storey cottages. Random-rubble. Skew-gabled. Pantiled and slated roofs.	C	Derelict except for No. 26.
3. 18 Main Street	Dated 1796. Trad. 2 storeys. Rubble. Coursers in front. Skew-gabled. Slated roof. Carved lintel incised 'W 1796 D'.	C	C Group (2, 3, & 4).
4. 21, 23, Main Street	18th cent. Trad. 2 storeys. Rendered. Skew-gabled. Slated roof.	C	
5. 7, 9, 11 Main Street	18th cent. Trad. Row of 3 cottages. 1 storey. Harled. Skew-gabled. Pantiled.	C	No. 9 is derelict.
6. Maconochies of Meadow- bank Burial Enclosure, Kirknewton Burial Ground	17th or 18th cent. Oblong. Random rubble. Rear wall of ashlar. No roof. Broken pediment (inset over). Interior overgrown.	B	From 1662 until 1790 the burial place of Maconochies of Meadowbank (for- merly Campbells of Inverawe, Argyll).
7. Dr. Cullen Burial Enclosure	Dated 1864. Oblong. Sneaked rubble. Ornamented doorway with segmental broken pediment and bronze relief of Cullen (inset memorial panel over).	B	Dr. Cullen of Ormiston (1710-90) was physician, botanist, philosopher and agricultural improver.
8. Hill House	Later 18th cent. Trad. 2½ storeys. 3 bays. Rubble. Skew-gabled. Slated roof.	C	Impressive situation.
9. Easter Newton Farmhouse	17th(?) cent. Trade. 2 storeys. Rubble; lime- washed sides. Corbie- step-gabled. Gabled projecting bay at rear. Lower skew-gabled to E.	B	

Name of Building	Type, Date, Architect, etc.	Category	
10. Waterloo Tower	1815(?). 'Gothick'. 2 storeys. Sneaked rubble. Dressed facework. Corner stones. Pointed latticed windows.	C	
11. Gate-way Dalmahoy Estate (?)	19th(?) cent. Gate-piers (moulded; ornamented) flanked by quadrant die-walls terminating in end-piers.	C	Disused, perhaps led originally to Dalmahoy House.
12. South Gate-way Hatton Estate	Dated 1892. Renaissance. High segmental arch (faced with pilasters) with narrower tower side arches (surmounted by consoles). Keystone inscribed 'Anno Dom. 1892'; bearing a tablet-sundial on its back; flanked by date '1829'.	A	Built for Richard, 4th Earl of Lauderdale on original site at E. end of mile-long avenue which led westwards to Hatton House, Removed hither 1829.
13. East Gate-lodge and Gate-way Linburn Park	Earlier 19th(?) cent. Lodge: Octagonal. Harled. Pyramidal slated roof. Dressed central octagonal chimney. Gate-way: Dressed stone piers. Cast iron gates.	B	
14. Sundial, Linburn Park	Dated 1891. Moulded pedestal on 3-stepped base. Much ornament and many inscriptions (one, 18 AMO 91).	C	Near site of Linburn House (enlarged 1890 by J. Jordan; demolished 1955).
15. Millrigg Farmhouse	Later 18th cent. Trad. 2 storeys; 3 bays. Harled. Skew-gabled. Slated roof (tiled ridge). Lower storey windows in round arched recesses. Plended 1-storey additions at W. end and rear.	C	
16. Ormiston House	1851. David Bryce. Scots Baronial. 2 storeys and basement. Stugged ashlar. Corbie-step-gabled. Angle turrets with conical roofs.	C	Built for Archibald Wylie of Ormiston.
17. Bridge Gogar Burn, Ormiston Estate.	19th cent. High segmental arch. Rock-faced coursers. Curious parapet (flat slab coping on short square pillars).	C	

Name of Building	Type, Date, Architect, etc.	Category	
18. Ormiston Hill House	17th cent. Trad. 2 storeys: 3 bays. Harled. Corbie-step-gabled. Slated roof. Addition to E. 1½ storeys; 3 bays. Skew-gabled. Piended dormers. String-course. Lean-to at rear: with pedimented and pilastered doorway.	C	Derelict. Seat of Cullens and later of Wilkies of Ormiston until 1851 when Ormiston House was built.
19. Old Coach-House, Ormiston Home Farm	Earlier 19th cent. Plain Georgian. Harled. Central portion: 2 storeys. Pedimented. Modern roofing. 1 storey piended wing to S.	C	Now a byre.
20. Kirknewton House	c. 1690 but greatly altered in Scots Baronial style c. 1835 by William Playfair and c. 1870. 2½ storeys. Random rubble. Slated roofs. Panelled interiors. 1-storey piended additions.	C	Once known as Meadowbank House. Built for James Maconochie, 1st of Meadowbank. Altered for 2nd Lord Meadowbank and Allan Maconochie, 4th of Meadowbank. Georgian East Wing built for 1st Lord Meadowbank c. 1795 was demolished c. 1950.
21. Ainville Farm-house	Later 18th cent. Georgian. 2½ storeys. 3 bays. Thinly rendered. Skew-gabled. Slated roof. Mutules. Round-headed gable windows. Cornice on modillions over door. 1-storey piended wings.	B	
22. Leithhead Farm, by the Water of Leith	House: Earlier 19th cent. Trad. 2 storeys. 3 bays. Rubble. Skew-gabled. Slated roof. Steading: 18th cent. 1 and 2 storeys and lofts. Pantiled roofs.	C	Formerly a grain mill.
23. Railway Viaduct, Linthouse Water	1842. 6 segmental arches. Dressed stones.	A	Partly in Mid Calder. Built for Caledonian Railway.
24. Calder Hall	c. 1800. Georgian. 2 storeys; 5 bays (and ones projecting). Ashlar. Blocking course and cornice. Ionic tetra-style portico.	B	Built for Dr. James Hare.
East Calder Village.			
25. St. Cuthbert's Church	Earlier 18th cent. Late Gothic. Oblong. Coursed rubble and ashlar. (N.	B	Ruin. East Calder (Calder-Ciere) was disjoined from

Name of Building	Type, Date, Architect, etc.	Category	
25. St. Cuthbert's Church (continued)	wall demolished). Gabled. Roofless. Belfry (17th cent.). Round-headed windows. Interior divided into burial enclosures of Hares of Calder Hall and Blairlogie, Stirlingshire and of Wilkies of Ormiston.		Calder Cornitis (Mid and West Calder) 1641 and this church became Parish Kirk. After union of Parish with Kirknewton 1751, church fell into neglect.
26. Merivil Cottage	Earlier 19th cent. Plain Georgian. 1½ storeys. Coursers; ashlar front. Skew-gabled. Slated roof. Blocking course and cornice. Corner stones. Architrave-cornice and engaged columns at doorway. Lower piended additions at ends.	C	
27. Haw Farm-house	Earlier 19th cent. Trad. 1 storey. Coursers. Skew-gabled. Slated roof. Piended offices at ends.	C	
28. Overshiel Farm-house	Earlier 19th cent. Georgian. 2 storeys. Ashlar. Piended slated roof. Architrave-cornice on engaged columns at doorway. Piended 1-storey offices at ends.	B	
29. South Gate-way, Almondell Park.	Earlier 19th cent. Segmental arch. Dressed voussoirs. Hammer-dressed piers. Flanked by quadrant die-walls.	C	At entrance to avenue to Almondell House (demolished c.1950) West Lothian. Lodge has been much altered.
30. Almondell Bridge, River Almond	c.1800. Alexander Nasmyth. 1 wide segmental arch with smaller one to N. Coursers. Rock-faced voussoirs. Castellated parapet; slab coping on square piers in centre.	B	Partly in Uphall, West Lothian. On avenue to Almondell House.
31. Canal Feeder Aqueduct, River Almond	1820. Cast iron trough on cantilevered support. Stone abutments.	B	Partly in Mid Calder. Carries feeder for Union Canal.
32. Mineral Railway Viaduct, River Almond	1885. 9 high segmental brick arches on rock-faced snecked rubble piers. Rubble parapet with iron railings. Rounded cut-waters.	B	Partly in Mid Calder. Built for branch mineral railway to camps.

APPENDIX B

TABLE 3.2 LIST OF ANCIENT MONUMENTS

(Prepared by the Ministry of Works, 1961).

MIDLOTHIAN

1. East Cairn Hill Cairn, near Harperrig.
2. "Castle Greg", Camilty Hill, near Harburn.
3. "Cat Stane", 700 yards East of Carlowrie.
4. Hog-backed monument, Old Kirkyard, Kirknewton.
5. Cairns Castle, Harperrig.
6. Murieston Castle, Midcalder.

WEST LOTHIAN

1. Cairnpapple Hill, 400 yards West by South of Wester Tartraven.
2. Bathgate Castle.
3. Newliston Dovecot.
4. Niddry Castle.

APPENDIX B

TABLE 3.3 MORE UNUSUAL SPECIES OF FLORA IN THE REGION
Drawn up by Miss E. Beattie.

Pepper Wood, Carlowrie.

- | | |
|---|--|
| <i>Ranunculus auricomus</i> L. | - Goldlocks Wood Crowfoot. |
| <i>Meconopsis cambrica</i> Vig. | - Welsh Poppy. |
| <i>Coronilla varia</i> L. | - Crown Vetch - roadside bank beside wood. |
| <i>Saxifraga hirsuta</i> L. | - Kidney Saxifrage. |
| <i>S. spatularis umbrosa</i> | - London Pride. |
| <i>Asperula odorata</i> L. | - Woodruff. |
| <i>Oxalis acetosella</i> L. | - Wood Sorrel. |
| <i>Valeriana pyrenaica</i> L. | - Heart-leaved Valerian. |
| <i>Doronicum pardalianches</i> L. | - Leopard's Bane. |
| <i>Doronicum plantagineum</i> L. | - Plantain-leaved Leopard's Bane. |
| <i>Campanula latifolia</i> L. | - Giant Bellflower. |
| <i>Lysimachia nummularia</i> L. | - Moneywort Creeping Jenny. |
| <i>L. nemorum</i> L. | - Yellow Pimpernel. |
| <i>Pulmonaria officinalis</i> L. | - Common Lungwort. |
| <i>Lamium galeobdolon</i> | - Yellow Archangel or Yellow Deadnettle. |
| <i>Polygonum bistorta</i> L. | - Bistort. |
| <i>Maianthemum bifolium</i> L. | - May Lily. |
| <i>Convallaria majalis</i> L. | - Lily of the Valley. |
| <i>Allium carinatum</i> L. | - Garlic - roadside beside wood. |
| <i>Arum maculatum</i> L. | - Lords & Ladies. Cuckoo Pint. |
| <i>Petasites albus</i> Gaertn | - White Butterbur. |
| <i>Allium paradoxum</i> (Bieb.) E. Don. | - Roadside - Carlowrie. |

Grounds of Carlowrie Castle.

- | | |
|---|-------------------------|
| <i>Gagea lutes</i> L. West Drive | - Yellow Gagea. |
| <i>Lithospermum purpureo-coeruleum</i> L. | - Creeping Cromwell. |
| <i>Geranium reflexum</i> L. | - Reflexed Cranes Bill. |

Kirkdriston.

- Banks of the River Almond.

- | | |
|--|-----------------------------------|
| <i>Symphytum uplandicum</i> Nyman | - Russian Comfrey. |
| <i>Hesperis matronalis</i> L. | - Dames Violet. |
| <i>Allium carinatum</i> L. | - Garlic. |
| <i>Lamium maculatum</i> var. <i>laevigatum</i> | - Spotted Deadnettle. |
| <i>Salix purpurea</i> L. | - Purple Willow. |
| <i>Myrrhis odorata</i> (L.) Scop. | - Sweet Cicely. |
| <i>Barbarea vulgaris</i> R. Br. | - Wintercress. |
| <i>Petasites hybridus</i> (L.) Gaertn (Mey & Scherb) | - Common Butterbur. |
| <i>Polygonatum cuspidatum</i> Steb. & Zucc. | - Japanese Knotweed. |
| <i>Allium ursinum</i> L. | - Ramsons. |
| <i>Pentaglottis sempervirens</i> Tausch | - Evergreen Alkanet. |
| <i>Doronicum pardalianches</i> L. | - Leopard's Bane. |
| <i>Origanum vulgare</i> L. | - Marjoram - railway embankment. |
| <i>Chaenorhinum minus</i> (L.) Lange | - Small Toadflax - railway lines. |
| <i>Endymion hispanicus</i> (Mill) Chouard | - Spanish Bluebell. |

- Cicerbita macrophylla* (Willd.) Wallr.
Geranium pratense L.
Geranium phaeum L.
Trifolium campestre Schreb.
Prunus spinosa L.
Caltha palustris L.
- Blue Sowthistle - railway embankment.
 - Meadow Cranes-bill.
 - Dusky Cranes-bill - Hallyards Castle.
 - Hop Trefoil - Hallyards Castle.
 - Blackthorn - Hallyards Castle.
 - Marsh Marigold - Hallyards Castle.

Canal nr. Auldcaithie above Winchburgh.

- Hippuris vulgaris* L. - Mares' tail.

Kirknewton.

- Trientalis europea* L.
Viola palustris L.
Gaultheria shallon Pursh
Pyrola minor L.
Tellima grandiflora (Pursh) Dougl. ex. Lindl.
Peltiphyllum peltatum (Torrey) Engler.
Rubus spectabilis Pursh
Eryngium yuccifolium (L.) Garcke
- Chickweed Wintergreen.
 - Marsh Violet.
 - Shallon.
 - Common Wintergreen.
 - Fringe-cups.
 - Umbrella Plant.
 - Salmon Berry or Pink Flowered Raspberry. - Kirknewton estate.
 - Wild Hyacinth.

Summit of East Cairn Hill.

- Aubus chamaemorus* L. - Cloudberry.

Bawdy Moss.

- Vaccinium oxycoccos* L. - Cranberry.

Cobbinshaw Reservoir.

- Pond near house - *Hippuris vulgaris* L.
In boggy ground - *Viola palustris* L.
Railway Line - *Anthyllis vulneria* L.
- Mares' tail.
 - Marsh Violet.
 - Ladies' Fingers.
 - Kidney Vetch.

- Railway line between Cobbinshaw & Harburg - *Listera ovata* (L.) R. Br.
On Paths - *Drosera rotundifolia* L.
Scutellaria galericulata L.
Lycopus europaeus L.
- Common Twayblade.
 - Common Sundew.
 - Skullcap.
 - Gipsywort.

Linhouse, Linhouse Water, South of Midcalder.

- Mimulus guttatus* D. C. - Monkey flower.

Ecclesmachan.

- Allium paradoxum* (Bieb.) G. Don. - roadside.

- Bangour Hospital - colony of *Montia Sibirica* (L.) Howell
 - Claytonia or Pink purslane.

Appendix C. AGRICULTURE

CROPS

Wheat

	<u>Midlothian</u>	<u>West Lothian</u>
% of total arable land 1938	9.8	11.1
Average yield - cwt/acre (1928-37)	24.9	24.4
Average yield - cwt/acre (1948-57)	28.9	28.3
% of total arable land 1958	approx. 6.7	approx. 10.0

While the area of land growing wheat has considerably dropped, the rise in yield has compensated for this. Wheat is marginal in much of the Area, due to its needing not less than 56°F. during July and August, and under 32" of rain. Other factors adversely affecting the growth of wheat in the Area include the high Autumn rainfall and the increasing soil acidity in south West Lothian, to which oats is far more tolerant. It is mostly grown below the 400 ft. contour. Straw is important in the farm economy and was formerly especially important in Kirkliston, for sale in Edinburgh.

Wheat does quite well on the heavy soils overlying boulder clay, and in rotation it generally follows potato crops; these two crops are therefore closely linked. Yields of wheat in the Area are higher than for any English county, and among the highest in Scotland.

Barley

		<u>Midlothian</u>	<u>West Lothian</u>
	%	cwt/acre	% cwt/acre
% and yields 1928-37	4.9	22.1	5.5 22.9
1948-57 approx.	12	28.2	11 27.9

There has been a tremendous increase in the total barley produced, due to more acreage and high yields. Barley needs a warmer, drier climate than wheat, and does best on the lighter basic soils. However, most of this is grown farther north than the Region with only a very small proportion grown in the Region. Mainly used as stockfeed.

Yields are higher than for any English county.

Oats

		<u>Midlothian</u>	<u>West Lothian</u>
	%	cwt/acre	% cwt/acre
1928 - 37	22.4	10.7	29.7 19.9
1948 - 57 approx.	30	21.4 app.	30 20.6

Oats is especially important in the Region, where the conditions are not suitable for other cereals. Oats withstands higher rainfall, lower temperatures than wheat or barley and tolerates more acid soil conditions. It is ideal therefore for upland or semi-upland farms. The yields above are in excess of those for most English counties. Oats is especially important as the main cereal crop in Bathgate, Whitburn, Livingston and Mid and West Calder.

The production of cereal crops in the Lothians is extremely important as such high yields are obtained. In the Region, the main production is oats, but in the northern parts, wheat and barley are more important and more profitable crops.

Turnips and Swedes

		<u>Midlothian</u>		<u>West Lothian</u>	
		%	tons/acre	%	tons/acre
1928 - 37		10.5	17.9	8.6	18.3
1948 - 57	approx.	7.5	20.1 app.	6.5	19.5

No county in England rivals these yields.

With high rainfall and stiff clay soils, it is difficult to produce the tilth necessary for seed-sowing. On many upland farms they constitute the only crop apart from oats and grass, and a small acreage of potatoes for domestic consumption. They are a very important part of the rotation as they act as a cleaning crop and provide cheap winter stock food.

With stock, they provide the fertility needed for the next cereal crop.

Potatoes

		<u>Midlothian</u>		<u>West Lothian</u>	
		%	tons/acre	%	tons/acre
1928 - 37		8.2	8.1	8.5	8.1
1948 - 57	approx.	6.2	9.0 app.	8.8	9.0

Potatoes form an essential part of the lowlands rotation and small plots are grown on nearly all upland farms. They are an important cash crop, providing local markets. Kirkcaldy grows more than any other parish in the Area.

Rape

This crop largely replaces mangolds further east, but is of relatively small importance.

Other minor crops include some sugar beet in the north, mangolds and kale.

Market Garden Crops

The production of these crops - vegetables, fruit, (tree fruit and soft fruit) and glasshouse produce is very small within the Area, and is only related to the larger centres of population.

Grass

Clover and Rotational Grasses

		<u>Midlothian</u>		<u>West Lothian</u>	
		%	cwt/acre	%	cwt/acre
1928 - 37		40.6	47.9	33.6	47.6
1948 - 57	approx.	41	41.7(hay)	31	40.9

About three-quarters of the grass in these counties is used for

grazing. The reason for the decrease in hay yield is probably due to production moving out to marginal areas. In the Lothians generally, the acreage of 'improved' land declines westwards as farmers tend to plant cereals or roots wherever land is worth ploughing. Disruption of drainage due to mining subsidence has reduced the area of rotational grasses in the west of West Lothian.

Permanent Grass

		<u>Midlothian</u>		<u>West Lothian</u>	
	%	cwt/acre	%	cwt/acre	
1928 - 37	19.9	41.4	30.3	44.9	
" proportion and yield of hay	6.1	33.4	8.5	41.0	
1948 - 57 approx.	14.0?	35.1	22.0?	36	

There is coincidence of hay production with high density of population. However, a feature of the area is that arable production often goes right up to the heath or moorland boundary, with little or no permanent grass between.

Permanent grass occupies a greater acreage than arable land in the four southern parishes of Whitburn, Mid and West Calder and Kirknewton.

The production of silage is to some extent replacing hay, especially with the Silo Subsidy scheme.

LIVESTOCK

Beef Cattle

In the Survey Area, beef production is relatively low because dairying is usually found more profitable where possible. Stock rearing and feeding is a very important by-product on arable farms.

		<u>Midlothian</u>	<u>West Lothian</u>
1938 Total Beef Cattle		7,528	4,614
1958 " " "		15,656	10,738

Dairy Cattle

		<u>Midlothian</u>	<u>West Lothian</u>
1938 Total Dairy Cattle		11,425	9,739
Dairy Cattle / 1,000 acres		102	188
1958 Total Dairy Cattle		11,931	7,287

Milk is one of the most important agricultural products in the Area. The high rainfall and heavy soils favour growing grass, and close proximity to large centres of population means that dairying is preferred to beef production.

The main breeds are Ayrshire or Shorthorns and increasing numbers of Friesians.

Sheep

	<u>Midlothian</u>	<u>West Lothian</u>
1938	204,455	22,654
1958	171,370	19,720

Mutton production on the arable lowland farms takes the form of stubble grazing in summer with roots in winter. The resulting manuring of the fields is important in the arable production.

The factors affecting sheep production are quite complicated. While much sheep production occurs in the Uplands, the density is often low and much of the Pentland moors need draining before being suitable. In the Uplands, production is usually based on breeding. Concentration of dairy cattle affects sheep densities in the rest of the Area.

Main breeds are Blackface on the higher grazings, Blackface by Down or Border Leicester Crosses on the semi-upland, Cheviots on the richer pastures, and the heavier breeds of Suffolk and Oxford Downs for mutton on the arable farms.

Pigs

	<u>Midlothian</u>	<u>West Lothian</u>
1938	21,455	5,180
1958	38,423	7,336

They are an increasingly important production in the Area, especially in the north and nearer population centres. The market for pig-meat has risen tremendously since the war and production has increased accordingly. Near towns and cities, swill feeding is important, as well as home-grown barley and broken potatoes. The pig population drops off as dairying increases.

Poultry

	<u>Midlothian</u>	<u>West Lothian</u>
1938	162,411	114,341
1958	167,727	118,733

This production is becoming increasingly more specialised throughout the area, with a drop in free-range hens on each farm, compensated by an increase of large-scale commercial flocks on the built-up litter system or layer battery system. Specialisation has arisen for the production for sale of hatching eggs, day-old chickens, young pullets, etc. Poultry is traditionally concentrated in the Kirkliston area and is mainly found on holdings of under 50 acres.

Horses

They are of minor importance now, and with increased mechanisation and intensification of production, they will continue to decrease.

APPENDIX C

TABLE 4.1 ARABLE, GRASS AND GRAZING ACREAGES, AND HAY YIELDS YEAR BY YEAR

	Midlothian			West Lothian			Scotland		
	1954	1958	1960	1954	1958	1960	1954	1958	1960
Total Crops, Grass and Rough Grazing	183,800	181,806	181,202	58,400	58,356	58,066	15,308,000	15,409,908	16,854,906
Total Crops and Grass	103,000	100,952	99,675	49,700	49,751	49,531	4,388,000	4,376,247	4,330,140
Tillage	47,700	40,240	40,080	22,900	22,080	22,294	1,680,000	1,579,861	1,548,075
Rotation Grass	25,600	28,162	39,020	10,300	10,300	16,992	1,502,000	1,566,003	1,882,453
Permanent Grass	33,700	32,550	20,575	16,500	17,391	10,245	1,206,000	1,230,383	899,610
Rough Grazing	80,800	80,854	81,527	8,700	8,605	8,535	10,920,000	11,033,661	12,524,766
<hr/>									
Yields cwt/acre	1928-37	1950-59	1960	1928-37	1950-59	1961	1928-37	1950-59	1961
Hay Rotation	47.9	43.9	46.6	47.6	43.7	55.3	?	32.0	33.5
Permanent	33.4	37.4	44.9	41.0	39.1	49.2	?	29.0	29.6

acres

TABLE 4.2 CROP ACREAGES AND YIELDS YEAR BY YEAR

Acreage	Midlothian				West Lothian				Scotland	
	1954	1958	1960	1964	1958	1960	1964	1960	1958	1960
Wheat	(acres) 4,800	4,467	4,845	3,100	3,181	3,070	78,000		89,275	94,555
Barley	" 8,000	8,486	9,270	3,000	3,708	5,277	184,000		212,899	254,252
Oats	" 15,900	13,728	12,312	10,000	8,979	7,897	851,000		751,990	680,594
Potatoes	" 5,300	4,372	4,500	3,000	2,908	2,763	166,500		147,196	152,300
Turnips & Swedes	" 5,400	5,124	4,883	2,200	2,015	1,951	277,000		256,311	244,190
Mangolds	" 300	180	165	100	49	59	8,000		5,368	6,282
Rape	" 400		1,323	600		537	33,000			30,710

Yields	1928-37				1950-59				1960			
	1928-37	1950-59	1960	1928-37	1950-59	1960	1928-37	1950-59	1960	1928-37	1950-59	1960
Wheat (cwt/acre)	24.9	32.0	39.4	24.4	29.1	32.6	-	26.0		-	26.0	30.4
Barley "	22.1	31.5	41.6	22.9	29.8	35.6	-	25.3		-	25.3	27.5
Oats "	20.7	23.2	27.3	19.9	22.6	26.6	-	18.6		-	18.6	20.8
Potatoes (tons/acre)	8.1	9.0	10.7	8.1	9.0	9.9	-	7.7		-	7.7	8.9
Turnips & Swedes "	17.9	20.7	22.5	18.3	19.1	19.6	-	17.8		-	17.8	20.1
Mangolds "	?	26.9	30.1	?	20.7	20.1	-	21.1		-	21.1	23.9

APPENDIX C

TABLE 4.3 LIVESTOCK NUMBERS AND HOLDINGS YEAR BY YEAR

	Midlothian			West Lothian			Scotland		
	1954	1958	1960	1954	1958	1960	1954	1958	1960
Total Beef Cattle	10,200	15,656	16,480	5,600	10,738	8,217	903,900	1,111,818	1,241,818
Total Dairy Cattle	9,100	11,931	14,236	11,300	7,281	11,311	805,800	707,772	761,006
Total Sheep	167,500	171,370	185,490	15,800	19,720	20,761	7,249,500	7,929,302	8,407,026
Total P'igs	42,600	38,432	36,036	11,300	7,336	6,001	553,000	495,780	402,630
Total Poultry	166,000	167,727	227,289	100,100	118,733	102,481	8,919,100	8,989,034	8,521,519

Holdings									
1 - 50	547	471	441	306	263	238	49,250	42,186	38,452
50 - 150	210	170	157	179	152	149	15,674	15,734	13,782
150 - 300	160	153	140	87	93	79	6,482	6,533	6,365
300 and over	81	91	97	24	27	35	2,184	2,493	2,708
Total	998	885	835	596	535	501	73,590	66,948	61,307
Average (acres)	103.3	113.3	119.4	83.5	92.3	96.9	59.6	66.4	70.6

APPENDIX C

TABLE 4.4 AGRICULTURAL WORKING POPULATION, AND NUMBER OF TRACTORS YEAR BY YEAR

	Midlothian					West Lothian					Scotland				
	1954	1958	1960	1964	1968	1960	1964	1968	1970	1974	1954	1958	1960	1964	1968
Total Agricultural Workers	3,300	2,700	2,490	1,300	1,070	1,006	97,300	88,400			82,626				
Total Regular Full-time Males	2,300	1,850	1,754	800	700	657	67,900	62,300			60,200				
Total Full-time	-	2,116	2,001	-	806	747	78,029	70,591			66,988				
Total Part-time	-	314	280	-	100	142	7,050	7,058			7,374				
Total Part-time Males	-	75	89	-	37	59	2,822	2,705			2,902				

Number of Tractors	1954	1959	1964	1969	1974	1979	1984	1989
	1,000	1,171	500	46,200	57,189			

Appendix D. REHABILITATION AND CONSERVATION

Oil Bearing Shale, Including Shale Composition, Decomposition and Acidity Values.

The bings found in the Area consist of argillaceous matter which is generally mudstone and various shales.

Secondary material such as sandstone, washery waste, inferior quality minerals, boiler clinker, limestone, fireclay, ashes, ironstone, ganister and pure blaes can be intermixed depending on the nature of the major recoverable mineral, the extraction method and the deposition method. Boiler clinker, washery waste and ashes do not appreciably affect a bing's composition. Entire bings of this former group, composed of a wet, fine-particled sludge, are generally inert, toxic, dark coloured and susceptible to gully erosion.

Argillaceous matter has in some cases disintegrated to form shale 'flakes' and mudstone 'cuboidal fragments'.

The rate of this basic disintegration has depended on rapid physical conditions closely related to orientation and chemical action.

Physically, shale, due to its sedimentary origin, has disintegrated, weathered and/or split by temperature variation along its lamination planes according to the age of the deposited material. Generally, the result has been a broken-down, weathered spoil matter within several years, and a type of soil after approximately twenty years exposure. After this twenty year period, depending upon the parent rock, the smaller particles deposited during the tipping stage, together with material formed by weathering, have created either a loose cellular-type fine textured soil structure; or, by climatic conditions, such as temperature variations, wind and rain, 'creep' to form a solid, non-porous 'clay like type' of spoil. When ganister or fireclay was present in the dumped material, then the degree of 'clayeyness' has increased.

Orientation of the individual shale particles related to a bing is allied to the disintegration rate.

Under Atterberg's International Soil Classification, the amount of fine-grained shale particles which are smaller than coarse sand (i.e. smaller than 0.2 mm.) is far greater (7.7%) on the south slope than on the north slope (1.6%).

From these figures, it is evident that for material larger than coarse sand, decomposition of shale bings facing south is nearly five times as rapid as that on the north.

Chemically, freshly tipped spoil generally contains 'toxins', also referred to as soluble salts, e.g. sulphur. If excessive sulphur particles exist in the spoil after deposition, the 'weathering' process releases these particles in dilute sulphuric acid form. This condition starts a chemical reaction by dissolving trace elements such as aluminium, manganese and potassium which can be as detrimental to plant life as insufficient nutrients.

The overall chemical composition of shale bings cannot be reached from a general analysis, as so many basic characteristics and conditions vary. As a general guide K.G. Clarke has given the chemical composition of weathered colliery bing material as a percentage (Table 7.1).

TABLE 7.1 CHEMICAL COMPOSITION OF WEATHERED COLLIERY BING MATERIAL AS A PERCENTAGE

Oxides	Shale	Soil Derived from Shale
Si O ₂	58.10	88.96
Al O ₃	15.40	4.86
Fe ₂ O ₃	4.02	2.86
Fe O	2.45	-
Mg O	2.44	0.43
Ca O	3.11	0.71
Na ₂ O	1.30	1.07
K ₂ O	3.24	0.91
H ₂ O	5.00	-
Ti O ₂	0.65	0.69
CO ₂	2.63	-
SO ₃	0.64	-
P ₂ O ₅	0.17	0.07
M _m O	-	0.07
Others	0.05	-

Each bing has to be chemically analysed to determine its 'toxicity' or 'acidity rating', either by experimental plantings or at a laboratory. Though the laboratory test is quicker, it should be secondary to a 'trial planting' scheme.

Plant Ecology

Plant ecology related to any bing varies according to the vegetation species existing adjacent to or near its base.

The chances of an even seed coverage are reduced the further a bing is from a supply source. Barren areas near a seed source will create an intensive growth area.

Generally, initial vegetation growth is either annual or biennial. These species tend to be carried by natural means onto the site and then become established.

Natural seed dispersal is by the wind and animal droppings. The degree of success in carrying these seeds depends upon:

- a wind intensity
- b wind direction
- c the proximity of the seed source to the bing
- d the type of seed source
- e the type of animal

Plant coverage on slightly acid bings within the Region can be sub-divided into:

a. the initial generator -

i	perennial lupin	- LUPINUS POLYPHYLLUS
ii	willow-herb	- EPILOBIUM variety
iii	early forget-me-not	- MYOSOTIS COLLINA
iv	meadow grass	- POA variety
v	fescue	- FESTUCA variety
vi	bent	- AGROSTIS variety

b. the selective group -

i	rye grass	- LOLIUM variety
ii	clover	- TRIFOLIUM variety
iii	coltsfoot	- TUSSILAGO FARFARA

Grass varieties of group b. are more dependent on spoil stabilisation, protection and, in particular, moisture, than on the initial species.

c. the tufted and rosette perennial herbs and grasses -

i	hawkweed	- HIERACIUM variety
ii	wild strawberry	- FRAGARIA VESCA
iii	sheep's sorrel	- RUMEX ACETOSELLA
iv	hair grass	- AIRA FLEXUOSA
v	Italian rye grass	- LOLIUM ITALICUM

Once grass seeds have germinated, growth spreads outwards, being more rapid if the seed variety develops epigeal stolons. This growth characteristic reduces particle movement and tends to form a light cover over a bing's surface.

Scrub and shrub growth originating mainly from plants existing at or near the bing base, follows the grasses. Unlike grass coverage the colonisation of scrub and shrubs commences at the base and extends up the bing slope.

Scrub and shrub growth encourages ultimate tree coverage, as the plant's rooting system assists in:

- breaking up the spoil particles.
- stabilising shale movement.
- restricting water run-off and evaporation, by forming an elevated cover and generally a shallow surface root system.
- creating a possible vegetable humus layer, through root disintegration. This not only supports the plant itself but also specialised vegetation.

Within the Lothians Region, scrub and shrubs growing on bings include:

a	broom	- CYSTISUS SCOPARIUS
b	bramble	- RUBUS variety
c	bracken	- PTERIDIUM variety
d	gorse	- ULEX EUROPAEUS
e	heath	- ERICA variety
f	rest harrow	- ONONIS REPENS

The greatest single contribution to any plant regeneration is provided by the latest coloniser, the tree. Its contribution is threefold affecting both natural and assisted ecology by:

- a stabilising bing material.
- b creating a micro-climate more conducive to the specialised plant.
- c creating fertile soil from decomposing roots and leaves.

Tree-growth provides a spectacular vegetative cover. Of the two basic types, evergreens and the deciduous variety, the latter is preferable. The annual leaf-fall of deciduous trees provides a natural humus layer over the surface material, and reduces any possible soot deposit on its leaves.

Observation throughout the Region indicates that Silver Birch (*BETULA PENDULA*) is the principal pioneer tree, supported by:

- | | | |
|---|-------------|-----------------------------|
| a | goat-willow | - <i>SALIX CAPREA</i> |
| b | alder | - <i>ALNUS GLUTINOSA</i> |
| c | hawthorn | - <i>CRATAEGUS MONOGYNA</i> |

These species tend to be economically valueless, but their advantage lies in their ability to establish cover and assist in the disintegration of bing material.

Once the initial disintegration has occurred, a more profitable variety may be slowly introduced.

Ash and sycamore, though evident on some spoil heaps within the Region, only invade the older, well-decomposed bings.

Though many planted woodlands are successfully growing on bare shale material throughout Britain, it should be emphasised that no tree-planting has occurred on the modern, steep-sided bings. Planted woodlands have been established on the old, flatter and more gradually sloping bings.

In rehabilitating land for a specific after-use, no attempt should be made to fight nature, but rather to encourage it; plant ecology must be assisted rather than conquered.

Any proposed planting scheme must be guided by varieties existing nearby, so that, in creating a 'natural' landscape, the established native plants should dominate.

Finally, it should be emphasised that successful ecological rehabilitation is not merely a matter of encouraging and cultivating a suitable pioneer crop; there should be a continual improvement in vegetation to create an economical asset and amenity for an area.

Plant Selection - Grass and/or Trees?

Plant species covering bings range from grass to trees, including scrub and shrubs.

Grass cultivated on shale provides quick green coverage and a fast 'humus' build-up rate.

The National Coal Board has found that tree mortality rate is higher and tree growth much slower on unvegetated bing material. ('The Problem of Derelict Land', West Riding County Planning Department, June, 1960). On the other hand, some tree species are adversely affected by the choking roots of grasses.

If scrub and shrubs are to be encouraged on tree-covered bings, then aspect, and more particularly, light intensity is important.

On northern slopes, ground coverage does not dominate as a factor of

success until pioneer tree species germinate and grow. On southern slopes, scrub and shrubs generally become established between and conjointly with the pioneer tree species.

Natural tree regeneration on northern bing slopes tends to support an even growth of similar aged trees of the same variety, if left undisturbed by man and beast.

On southern slopes, tree growth is both erratic and uneven, being more dense around the flatter, lower bing areas.

Considering the 'time' factor alone, reasonable grass coverage will become fairly well established within a season, providing it is carefully maintained. An effective north facing tree-cover cannot be expected in less than 15 to 20 years, and between 30 and 40 years on southern slopes. Neglecting the time factor, exposed positions such as bing tops, if carefully planted with a mixture of conifers and deciduous trees, are physically and visually better than grass covered.

Irrespective of what vegetation selection is adopted for planting bings, a comprehensive ecological study must be made so that the correct type and species may be used for each rehabilitation proposal.

Economically, afforestation provides a timber return, whilst grass allows either animals to graze or grass to be cut for hay-making, silage or grass-mulch for market gardeners.

The ultimate selection between grass and tree species on shale bings depends directly upon each site's after-use.

Grass Propagation

The propagation of grass on shale can be achieved unaided by artificial treatment. This method is slow in producing an overall green coverage. The quickest way to provide a grass cover is by importing top-soil and/or organic matter. This relatively expensive form of treatment can often be substituted by the application of fertilizers.

Should bings have an excessively high acidity rating value, carbonate of lime should be applied initially to the shale material.

This treatment should be followed by additional fertilizers to encourage and develop a continuing 'humus' bearing layer.

The Grassland Institute recommends that the rate of applying fertilizer per acre on shale, prior to grass seeding, should be 10 - 15 cwt. of water soluble phosphatic fertilizer, followed by 3 - 5 cwt. of sulphate of ammonia or nitro-chalk, and finally 3 - 5 cwt. of 60% muriate of potash.

A selection of grasses and clovers which tend to have the dual advantages of providing a suitable green sward and a potential agricultural value on shale is as follows:

ACHILLEAMILLEFOLIUM	- Yarrow
AGROSTIS PALUSTRIS	- Florin
AGROSTIS TENUIS	- Brown Bent-grass
AVENA SATIVA	- Oats
BRASSICA NAUPUS	- Rape
CYNOSURUS CRISTATUS	- Crested Dogstail

DACTYLIS GLOMERATA	- Cocksfoot (S. 143)
DESCHAMPSIA FLEXUOSA	- Wavy Hair-grass
FESTUCA RUBRA	- Red Fescue
FESTUCA RUBRA, SUB. SP. GENUINE HACK	- Creeping Red Fescue (S. 59)
HOLCUS LANATUS	- Meadow Soft Grass
LOLIUM ITALICUM	- Italian Rye Grass (S. 22)
LOLIUM PERENNE	- Perennial Rye Grass (S. 23)
LUPINUS POLYPHYLLUS	- Lupins
PHLEUM PRATENSE	- Timothy (S. 48)
POA PRATENSIS	- Smooth Stalked Meadow Grass
POA TRIVALIS	- Rough Stalked Meadow Grass
SECALE CEREALE	- Rye
TRIFOLIUM HYBRIDUM	- Alsike Clover
TRIFOLIUM PRATENSE	- Early Red Clover (S. 151)
TRIFOLIUM REPENS	- White Clover (S. 100)

(NOTE: Numbers in brackets indicate their market trade number)

Grass selection should take into consideration those varieties which are most likely to germinate on a particular type of shale and produce an even growth coverage throughout the growing year.

For the most effective annual cover, a single grass type should not be sown. Instead, varying proportions of many varieties should be selected, according to the features of each site.

Shale of low germination potential requires a minimum rate of 40 lbs. of grass seed per acre. Naturally, the grass cover will vary according to the seeding rate, although this growth rate progressively decreases as the seed quantity increases. The optimum seeding rate is 65 lbs. per acre on level spoil.

Application rates at Bickershaw Reservoir and Bickerstaffe, Lancashire, were 45 lbs. per acre and were made up of the following grass mixture:

12% Italian Rye	(S. 22)
14% Perennial Rye	(S. 23)
50% Cocksfoot	(S. 143)
8% Timothy	(S. 48)
10% Creeping Red Fescue	(S. 59)
6% Early Red Clover	(S. 151)

(NOTE: Numbers in brackets indicate their market trade number)

(* Experiment in Grassland Establishment on Colliery Shale.
Bickershaw Reservoir Site, Abram. 1954 - 1960. U. Aymer
Coates, County Planning Officer, Lancashire County Council.)

Primary grass mixtures should contain both 'fescue' and 'rye' grasses. The former species, 'fescue', is a typical moorland grass, being most suitable on poor, dry, acid shale matter. The latter, 'rye' grass, establishes itself in a series of little spreading erect tufts which die out after a second season. The advantage of this species is its adaptability to establish itself and grow quickly before being a later 'humus' source after the second growing season.

Tree Propagation

Tree propagation on shale is a three stage process: the 'pioneer' species, the 'specialised' crop and the 'ultimate' selection.

The 'pioneer' tree is generally the nitrogenous supplier, the 'specialised' crop produces a visual and economic return, whilst the characteristic feature of each bing particle around the tree's roots will determine its 'ultimate' development.

In suggesting tree species suitable for planting on a particular bing, local physical conditions are bound to vary over its surface.

By propagating a single tree species, one may not always produce the desired or the landscaped effect. Thus, a mixture of several varieties should be planted.

The essential requirement of any pioneer tree planting programme is to select species that:

- a require a low nutrient value
- b stabilise bing material
- c improve the humus and/or organic content of the material
- d rapidly create a type of soil
- e produce a heavy seed crop
- f cultivate a vigorous root network
- g retain moisture
- h provide shade during hot days, for the smaller plants that may germinate and grow
- j withstand the soil acidity rating

Colliery shale, carrying a high percentage of iron pyrites and aluminous compounds, quickly destroys tree varieties such as the black locust and the grey alder.

Such sites should be covered or 'pocketed' with soil prior to any afforestation.

Nitrogen deficiencies, common in spoil, retard the growth of most hardwoods. Nitrogen-fixing tree species can remedy this by absorbing free nitrogen present in the atmosphere and transferring it into the soil. Livestock can also be another nitrogen source.

Depending on the nitrogen deficiency present in the bing material, 'pioneer' tree varieties can be classified as follows:

Group 1 - the nitrogen-fixing species -

Grey Alder	- ALNUS INCANA
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Group 2 - the non-nitrogen-fixing species -

Silver Birch	- BETULA PENDULA
Wild Cherry	- PRUNUS AVIUM
Hawthorn	- CRATAEGUS OXYCANTHA
Black Italian Poplar	- POPULUS SEROTINA
Goat Willow	- SALIX CAPREA

Whether a 'pioneer' planting programme commences with Group 1 or 2 depends upon the fertility condition of the bing material, each tree's micro-climate, atmospheric pollution, the effect of vandalism and the biotic factor.

The effect of the perennial lupin on initial tree growth is recommended. Sycamores can grow twice their normal seasonal height if planted amongst this herb.

Once initial growth has taken place and a layer of 'humus' has become established, the sunlight-demanding lupin dies by tree overshadowing.

Ecologically, once the 'pioneer' planting has established itself, the 'specialised' tree may be gradually introduced. This larger tree group can include some of the conifer family, though they tend to acidify shale. Planting conifers in areas susceptible to atmospheric pollution should not be encouraged as chemicals within the atmosphere reduce the resistance of conifer needles. Once this has occurred it takes several years for a species to be recovered in needles. In areas polluted by smoke and fumes, the varieties

Douglas Fir	- PSEUDOTSUGA DOUGLASHI
European Larch	- LARIX EUROPEA
Norway Spruce	- PICEA EXCELSA

should not be planted.

For quick, final growth, evergreen cover and protection, a mixture of Scots Pine and a 'pioneer' deciduous tree, such as Silver Birch, should be planted. Scots Pine and Silver Birch have a different root system, form different organic matter and possess a variation in life expectancy. Features such as these form a 'balanced woodland'.

The 'ultimate' tree selection should be based on both economics and the silvicultural requirements of the site. The market of forestry-produce and the original aim in planting, whether it be for amenity, afforestation, soil stabilisation, soil improvement, shelter or any combination of these, should always be borne in mind.

As a guide the tree species in Table 7.2, though far from being complete, have various cultural potentials on bing material.

TABLE 1.2 TREES FOR REHABILITATION

KEY TO COLUMN HEADINGS

Column Number		Common Name of Tree	Column Number																
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	{ L - Large tree M - medium tree S - small tree	Alder: Common	M	A	A	B	C												
2	{ A - Hardy B - Not hardy	Ash	M	A	B	A	C	B	/	/									
3	{ A - Smoke tolerant B - Smoke intolerant	Beech	L	A	B	B	C		/	/	/								
4	{ A - Evergreen B - Deciduous	Birch: Silver	M	A	B	A	B	A	/	A	/	/							
5	{ A - Prefers acid soils B - Soil neutral to slightly acid C - Soil slightly alkaline to neutral	Cherry: Wild	M	A	B	C		B	/										
6	{ A - Particularly suitable on erodible silty waste B - " " " " " " C - Suitable to cultivate on erodible waste	Commoner Pygidia	S	A	A	A	C												/
7	{ A - Particularly suitable on oil-bearing shale material B - " " " " " " C - Suitable on both materials	Elm: Wych	L	A	A	B	B	B	/	/	/								B
8	{ A - Good on exposed sites where shelter is the principal requirement B - " " " " " " C - " " " " " "	Hawthorn	S	A	A	B	C	A	/	/	/								A
9	{ A - Satisfactory on lower slopes or where no wind stagnation exists B - " " " " " " C - " " " " " "	Hornbeam	L	A	A	B	B	B	/	/	/								
10	{ A - Species suited to open banks B - " " " " " " C - " " " " " "	Horse Chestnut	L	A	A	B	C												
11	{ A - Able to withstand extreme shade conditions B - " " " " " " C - " " " " " "	Laburnum	S	A	A	B	B	C	/	/	/								/
12	{ A - Good on exposed sites where shelter is the principal requirement B - " " " " " " C - " " " " " "	Larch: Japanese	L	A	B	B	B	B	/	/	/								/
13	{ A - Satisfactory on lower slopes or where no wind stagnation exists B - " " " " " " C - " " " " " "	Lilac	S	A	A	B	C												
14	{ A - Species suited to open banks B - " " " " " " C - " " " " " "	Lime	L	A	A	B	C	/	/	/									
15	{ A - Able to withstand extreme shade conditions B - " " " " " " C - " " " " " "	Maple: Norway	L	A	A	B	A	/											B
16	{ A - Good on exposed sites where shelter is the principal requirement B - " " " " " " C - " " " " " "	Oak	L	A	A	A	C	C	/	/	/								B
17	{ A - Good on exposed sites where shelter is the principal requirement B - " " " " " " C - " " " " " "	Pine: Austrian	L	A	B	A	C	/											
18	{ A - Produces heavy root system B - " " " " " " C - " " " " " "	Beach (Castanea)	S	A	B	A	C												
19	{ A - Ultimately a dominant tree species B - " " " " " " C - " " " " " "	Cornus	L	A	A	A	C	/	A	/	/								
20	{ A - Likes abundant sunlight B - " " " " " " C - " " " " " "	Spindle	L	A	B	A	A	C	C	/	/	/							B
21	{ A - Reversetended "younger" tree species B - A specialized tree C - Ornamental value only	Plane: London	L	A	B	B	C		B										B
22	{ A - Reversetended "younger" tree species B - A specialized tree C - Ornamental value only	Poplar: Black (Italica)	L	A	B	C	/	/	/	/	/								A
23	{ A - Reversetended "younger" tree species B - A specialized tree C - Ornamental value only	Rowan	S	A	B	A	A	A	A	/									B
24	{ A - Reversetended "younger" tree species B - A specialized tree C - Ornamental value only	Spirea:Norway	L	A	B	A	B	B	/	/	/								
25	{ A - Reversetended "younger" tree species B - A specialized tree C - Ornamental value only	Silica	L	A	A	A	B	A	/	/	/								
26	{ A - Reversetended "younger" tree species B - A specialized tree C - Ornamental value only	Sycamore	L	A	B	C	B	/	B	/	/								B
27	{ A - Reversetended "younger" tree species B - A specialized tree C - Ornamental value only	Willow (Salix)	M	A	B	C	/	/	/	/	/								A





REHABILITATION PROPOSALS



PRIORITY AREAS





ORDER OF PRIORITY

BINGS OR TIPS -

-  major regrading, spreading & planting.
-  reduce excessive slopes and plant.
-  screen with trees &/or grass cover.
-  remove by spreading and plant site with trees and/or grass.






QUARRIES OR PITS -

-  fill in, and/or shape, and/or plant site with trees and/or grass.
-  continue to fill in as existing.
-  develop site and its adjacent land as a recreation area.
-  screen around site with trees.






STRUCTURES -

-  plant tree screen around structure.
-  demolish structure and tidy up site.
-  improve structure and surroundings.



COMMUNICATION OR SERVICE LINE -

-  retain line as a recreation link.
-  remove line and tidy up site.
-  screen line with trees.

KEY

to the maps attached to Tables 7.3-7.7, Appendix D

APPENDIX D

TABLE 7.3 PRIORITY AREAS 1, 2 & 10

BINGS AND TIPS

Priority Areas 1, 2 & 10

MAP REFERENCE NUMBER	MAP IDENTIFI- CATION SQUARE	MATERIAL a. oil shale b. colliery waste c. sandstone spoil d. cinder and ash e. fireclay shale f. refuse tip g. burning	VEGETATION a. yes b. partly c. no d. grass e. trees	HEIGHT (feet)	AREA (acres)
2	K21	a	c	125	27.4
4	K21	a	b, d	200	17.0
6	K20	a	a, d	130	19.2
10	K21	a	c	200	64.8
*20	D17	a	a, d, e	80	30.0
26	C19	a	c	175	65.4
28	E23	a, g	b, d	200	80.4
58	J20	a	c	200	24.0
60	H20	a	b, d	200	22.0
64	J20	a	a, d	130	30.8
68	E22	a	c	100	22.6
72	G22	a	c	150	14.0
74	G22	a	b, d	200	23.0
76	F23	a	b, d	200	20.5
78	F22	a	c	250	80.6
84	F21	a	b, d	55	30.0
86	E22	a	b, d	80	3.2
98	G20	a	b, d	25	5.0
100	G19	a	b, d, e	30	0.6

* Denotes Bing or Tip outside the Regional Boundary but inside the Rehabilitation Area

QUARRIES AND PITS

Priority Areas 1, 2 & 10

MAP REFERENCE NUMBER	MAP IDENTIFI- CATION SQUARE	MATERIAL a. stone b. sand c. unknown d. clay e. reservoir f. open cast shale	HOLDING WATER - a. yes b. partly c. no d. impossible e. kept dry by pump	DEPTH (feet)	AREA (acres)
12	D22	d	a	-	13.2
90	D24	a	a	-	3.6
92	D24	a	c	30	0.8
94	C23	a	a	-	1.6
*96	F21	f	c	60	4.0
*112	G19	a	a	-	2.0
152	F19	a	a	-	2.6

* Denotes Quarry or Pit being filled with Council refuse

MAP REFERENCE NUMBER	MAP IDENTIFI- CATION SQUARE	TYPE a. sports field b. pit head c. farm outbuildings d. builder's yard e. education f. fence g. residences h. industrial j. commercial k. brick works m. public services	MATERIAL a. galv. iron b. brick c. wood d. asbestos cement e. glass f. stone g. concrete h. steel j. vacant	SURROUND- ING AREA AFFECTED (acres)	AREA (square feet, un- less otherwise stated).
8	K20	f	a	2.5	1,800 feet
14	D22	k	b	3.4	43,560
16	D21		b	1.0	1,500
18	D19	g	a, b, f	0.5	3,600
*22	D18	j	a	2.0	1,500
*24	D18	j, c	c, a	2.5	10,890
30	E26	g	b	0.5	1,250
32	E26	m	c	-	20
34	E26	g	f	0.5	450
36	F27	b	b	2.5	2,260
38	F28	e	c	0.08	200
40	F29	e	c, d	2.0	2,260
42	F29	e	c, e	2.0	840
44	G27	d	b, c	0.25	2,260
46	G27	a	b	-	150
48	G26	e	a, c	0.5	21,780
50	G24	m	b	0.05	400
52	G23	j	d	-	15,000
54	G22	j	b, d	-	11,250
56	H21	c	c, a	10.0	21,780
62	H20	d	a	2.5	2,722
66	E22	g	f	0.2	8,712
70	E22	j	b	0.09	2,500
80	G22	a	a	3.0	1,800
82	G22	j	c, a	3.0	1,020
88	E23	h	b	5.5	100,000
220	E23	c	f	1.8	10,890
300	F22	d	a, b, c	1.5	21,780

* Denotes Structure outside Regional Boundary but inside the Rehabilitation Area

APPENDIX D

TABLE 7.4 PRIORITY AREAS 3, 5, 8 and outside

BINGS AND TIPS

Priority Areas 3, 5 & 8 and outside

MAP REFERENCE NUMBER	MAP IDENTIFI- CATION SQUARE	MATERIAL a. oil shale b. colliery waste c. sandstone spoil d. cinder and ash e. fireclay shale f. refuse tip g. burning	VEGETATION a. yes b. partly c. no d. grass e. trees	HEIGHT (feet)	AREA (acres)
1	O9	e	c	15	0.8
5	N9	b	b, d	25	3.0
13	M10	d, g	a/d, b/e	55	1.5
15	M10	d	a/d, b/e	40	0.8
17	N10	d, g	a/d, b/e	10	1.0
19	M10	d	a, d	65	2.4
21	N10	a	a, d	40	9.2
27	M11	d	a, d	20	4.0
29	M11	d	a, d	20	2.0
37	M11	f	e	5	3.8
39	M11	d	b, d	10	4.8
43	L11	d, g	b, d	15	4.0
45	M11	c, d, f	c	6	1.4
47	M10	b	b, d	20	0.8
49	M10	c, d, f	b, d	15	3.0
53	N11	b	c	40	11.0
57	N14	a, f	b, d, e	175	30.0
59	N11	b	c	45	13.6
63	M12	d	c	6	1.5
67	L15	a	a, d	2	12.0
77	L14	b	b, d	15	0.4
85	L15	a	c	250	182.0
89	N14	d	a, d, e	40	4.0
91	M14	d	b, d	40	4.0
102	M 9	b	b, d, e	40	13.0
114	M 8	b	a, d	20	2.5
120	K 9	b	c	200	22.8
122	L 8	d	a, d	25	2.85
124	L 8	d	a, d	15	1.4
126	K11	b	c	20	5.2
128	K11	b	a, d	50	3.0
134	K 6	b	c	150	6.8
136	M 5	b	b, d	70	8.0
138	L 9	a	b, d	12	2.8
148	L 6	b	a, d	5	9.5
150	L 7	d	c	25	1.8
207	M15	b	a/d, b/e	15	1.5

QUARRIES AND PITS

Priority Areas 3, 5 & 8 and outside

MAP REFERENCE NUMBER	MAP IDENTIFI- CATION SQUARE	MATERIAL a. stone b. sand c. unknown d. clay e. reservoir f. opencast shale g. limestone h. roadstone	HOLDING WATER - a. yes b. partly c. no d. impossible e. kept dry by pump	DEPTH (feet)	AREA (acres)
23	M10	e	d	10	2.0
25	M12	b	c	30	7.0
33	M12	b	c	30	0.6
69	L15	a	c	15	0.7
81	L14	a	c	25	1.0
*146	L 7	d	a	30	2.2
205	N15	a	b	20	0.5

* Denotes Quarry or Pit being filled with Burgh refuse

STRUCTURES

Priority Areas 3, 5 & 8 and outside

MAP REFERENCE NUMBER	MAP IDENTIFI- CATION SQUARE	TYPE a. sports field b. pit head c. farm out- buildings d. builder's yard e. education f. fence g. residences h. industrial j. commercial k. brick works m. public services	MATERIAL a. galv. iron b. brick c. wood d. asbestos cement e. glass f. stone g. concrete h. steel j. vacant	SURROUND- ING AREA AFFECTED (acres)	AREA (square feet un- less other- wise stated)
3	O 9	b	b, g	1.8	756
7	N 9	b	a, b, h	3.5	4,000
8	N 9	b	b	4.0	4,420
11	M10	b	b	3.0	87,120
35	M11	m	b	1.0	1,000
41	L11	m	b, g, h	-	3,000
51	M11	m	b, g	1.0	560
55	N10	b	b, c, a	2.0	1,000
65	O 21	c	f, b	10.0	10,000
71	L16	m	b, f	1.0	160
73	N15	c	b, g	0.09	2,500
79	M14	m	a, b, c	-	100
83	L14	c	b, f	0.5	2,150
87	L14	c	b, g	1.0	287
93	M15	j	b	-	300
116	M 7	g	b	0.5	400
118	K 8	b	a, c	2.0	400
130	K11	b	b	3.5	16,200
132	K10	b	a, c	3.5	1,200
142	J13	g	f	0.06	525
144	J14	g	f	0.06	450

COMMUNICATIONS AND SERVICE LINES

Priority Areas 3, 5 & 8 and outside

MAP REFERENCE NUMBER	MAP IDENTIFICATION SQUARE	USE a. railway b. elect- ricity	SLEEPER & LINE CONDITION a. used b. disused c. removed	VEGETATION a. yes b. partly c. no d. grass e. trees f. scrub	RELATIONSHIP TO NATURAL SURFACE a. above b. level c. below	LENGTH (miles)
31	M11	a	a	b, d, f	a	1
61	M13	a	b, c	a, d	a	1½
75	M15	a	b, c	a, d	a/b	1
204	N 9	a	b	a, d, e, f	a/b	1
206	Q 9	b	b	-	a	½

APPENDIX D

TABLE 7.5 PRIORITY AREA 4

QUARRIES AND PITS

Priority Area 4

MAP REFERENCE NUMBER	MAP IDENTIFI- CATION SQUARE	MATERIAL a. stone b. sand c. unknown d. clay e. reservoir f. open cast shale g. limestone h. roadstone	HOLDING WATER - a. yes b. partly c. no d. impossible e. kept dry by pump	DEPTH (feet)	AREA (acres)
* 170	L23	c	e	-	2.2
172	M23	c	a	-	2.5
186	S23	h	c	30	0.125
190	Q24	a	c	30	1.0
221	M23	c	a	-	1.0

* Denotes quarry or pit being filled with Council refuse

BINGS AND TIPS

Priority Area 4

MAP REFERENCE NUMBER	MAP IDENTIFI- CATION SQUARE	MATERIAL a. oil shale b. colliery waste c. sandstone spoil d. cinder and ash e. fireclay shale f. refuse tip g. burning	VEGETATION a. yes b. partly c. no d. grass e. trees	HEIGHT (feet)	AREA (acres)
156	N21	a	b,d	150	32.8
158	O21	a	b,d	200	22.4
162	L24	b,c	a,d	25	0.5
164	L24	a	a,d	20	1.4
168	L24	a	a,d	25	0.6
176	N20	b	b,d	25	2.4

MAP REFERENCE NUMBER	MAP IDENTIFIC- ATION SQUARE	TYPE	MATERIAL	SURROUND- ING AREA AFFECTED (acres)	AREA (square feet, unless other- wise stated)
		a. sports field	a. galv. iron		
		b. pit head	b. brick		
		c. farm out- buildings	c. wood		
		d. builder's yard	d. asbestos cement		
		e. education	e. glass		
		f. fence	f. stone		
		g. residences	g. concrete		
		h. industrial	h. steel		
		j. commercial	j. vacant		
		k. brick works			
		m. public services			
154	M21	g	b	1.0	1,000
160	N21	g	b,f	5.0	2,000
166	L24	j	a,d	45.0	40,000
174	N20	c	b,a	0.5	1,500
184	S22	g	f	0.8	1,125
188	R24	g	f	-	300
192	M26	c	a	1.5	1,200
208	N19	g	f	0.125	1,000

APPENDIX D

TABLE 7.6 PRIORITY AREAS 6, 7, 9 and outside

BINGS AND TIPS

Priority Areas 6,7 & 9 and outside

MAP REFERENCE NUMBER	MAP IDENTIFIC- ATION SQUARE	MATERIAL a. oil shale b. colliery waste c. sandstone spoil d. cinder and ash e. fireclay shale f. refuse tip g. burning	VEGETATION a. yes b. partly c. no d. grass e. trees	HEIGHT (feet)	AREA (acres)
95	O16	a	b, c	30	1.5
97	O15	a	b, d, e	25	3.5
108	P11	b	c	160	9.0
109	R14	a	b, d	240	74.0
111	Q14	a	c	20	10.0
113	R14	a, g	b, d, e	30	30.0
115	P16	a, g	b, d	70	4.5
117	P16	a	c	20	0.4
119	P16	a	b, d	45	0.5
121	P16	a	a/d, b/e	20	0.4
123	P16	a	b, d, e	35	1.5
129	P16	a	a, d, e	10	5.0
135	P16	a	a/d, b/e	20	0.4
137	Q15	a	a, d	25	1.5
139	Q15	a	b, d	25	5.0
140	P10	b, g	c	60	10.6
141	Q16	a	b, d, e	20	2.5
145	Q16	a	b, d	48	2.0
149	R16	a	b, d	25	3.6
153	R17	b	b, d	10	0.4
155	R16	d	c	10	0.2
171	R15	a	c	30	2.6
175	S14	a	a, d	35	4.6
181	O14	b	c	20	0.5
185	P14	a	b, c	40	9.2
191	P14	a, g	b, d	300	41.0
193	P15	a	b, d, e	30	3.0
194	U14	b	c	20	4.0
195	P15	a	c	50	2.8
198	O10	e	c	40	0.5
200	S14	b	b, d	50	4.1
203	P14	b	b, d	12	0.4
212	T11	b	b, d	75	11.4
214	P10	b	c	140	6.8
222	O10	f	b, d	20	0.6
230	O11	b	b, d	70	1.5
234	P11	b	b, d	15	4.0
236	P12	b	c	80	3.2
242	Q11	b	b, d	40	4.6
244	Q11	b, g	c	120	11.2
252	Q12	b	c	15	2.4
258	R11	b	c	100	6.8
260	R11	b	c	70	12.0
266	R12	b	b, d, e	60	5.2

QUARRIES AND PITS

Priority Areas 6, 7 & 9 and outside

MAP REFERENCE NUMBER	MAP IDENTIFI- CATION SQUARE	MATERIAL a. stone b. sand c. unknown d. clay e. reservoir f. open cast shale g. limestone h. roadstone	HOLDING WATER - a. yes b. partly c. no d. impossible e. kept dry by pump	DEPTH (feet)	AREA (acres)
143	Q16	a	d	50	2.0
163	R14	e	a	-	2.8
178	U17	a	d	40	3.0
182	U16	g	b	40	0.04
201	P15	e	d	8	2.8

STRUCTURES

Priority Areas 6, 7 & 9 and outside

MAP REFERENCE NUMBER	MAP IDENTIFI- CATION SQUARE	TYPE a. sports field b. pit head c. farm outbuildings d. builder's yard e. education f. fence g. residences h. industrial j. commercial k. brick works m. public services	MATERIAL a. galv. iron b. brick c. wood d. asbestos cement e. glass f. stone g. concrete h. steel j. vacant	SURROUND- ING AREA AFFECTED (acres)	AREA (square feet un- less other- wise stated)
99	O15	c	a	2.0	903
101	P15	e	b	10.0	5,200
105	Q15	f	a	2.5	1,500 feet
107	P15	c, f	a	0.25	60
125	P16	c	a, c	0.5	100 feet
127	P16	c	a, c	0.33	1,000
151	R17	b	b	7.0	3,000
157	R14	h	b	-	2,925
159	R13	h	b	-	1,650
161	R13	h	b	-	1,200
165	R13	h	b	80.0	15,000
167	R13	h	b	1.5	720
179	S14	c	b	17.0	259
180	U18	b	b	-	1,000
183	P14	b	b, j	1.0	4,000
187	P15	b	b	3.0	2,600
197	P15	m	f	-	2,000
199	P15	c	c, b, a, d	1.0	21,560
202	T14	h	b, g, h	2.0	43,560
218	P10	b	b	10.0	750
224	O10	b	a, b, g, h	13.5	21,560
		b	a, b, c, g, h	8.0	87,120
228	Q11	b	a, b, f, g, h	2.0	2,000
232	P11	b	a, b, c, g, h	5.0	1,200
238	Q12	c	a	1.0	150
246	Q11	b	a, b, c, g, h	20.0	130,680
250	Q12	b	c, d, b, g	4.0	1,925
256	S11	b	b, h	12.0	3,550

MAP REFERENCE NUMBER	MAP IDENTIFICATION SQUARE	USE a. railway b. elect- ricity	SLEEPER & LINE CONDITION a. used b. disused c. removed	VEGETATION a. yes b. partly c. no d. grass e. trees f. scrub	RELATIONSHIP TO NATURAL SURFACE a. above b. level c. below	LENGTH (miles)
103	P15	a	b	a/d, b/ef	a	$1\frac{1}{2}$
131	P15	a	b, c	a, d	a	$\frac{1}{2}$
133	P16	a	b, c	b/d, b/f	a	one-sixth
147	Q17	a	b, c	a/d, b/e	a	1
169	R13	a	b, c	b/d	a	$1\frac{1}{2}$
173	R14	a	b, c	b, d	a	$1\frac{1}{2}$
177	S14	a	b, c	b, d, e	a/b	$1\frac{1}{2}$
188	P15	a	b	a, d, f	a/b	$1\frac{1}{2}$
226	Q11	a	b	b, d, f	b	$1\frac{1}{2}$
240	Q12	b	b	-	a	one-sixth
248	Q12	a	b	b, d	b	$2\frac{1}{2}$
254	R11	b	b	-	a	$\frac{1}{2}$
264	R12	a	b	a/d, b/f	a/c	1

APPENDIX D

TABLE 7.7 PRIORITY AREAS 11 & 12

BINGS AND TIPS

Priority Areas 11 & 12

MAP REFERENCE NUMBER	MAP IDENTIFI- CATION SQUARE	MATERIAL a. oil shale b. colliery waste c. sandstone spoil d. cinder and ash e. fireclay shale f. refuse tip g. burning	VEGETATION a. yes b. partly c. no d. grass e. trees	HEIGHT (feet)	AREA (acres)
104	T 8	b	b, d	25	0.8
106	W 5	c	a, d	20	4.0
110	P 5	b	b, d	85	5.6
196	S 6	b	a, d	20	8.6
211	Q 4	f	c	5	0.4
213	Q 5	f	c	15	0.8
215	R 5	b	c	60	2.9
216	U 6	b	b, d	65	2.8
217	R 5	b	c	20	7.4
219	R 5	b	c	15	2.0
223	R 5	b	a, d	20	3.0
225	S 5	b	b, d	20	2.8
241	S 5	b	c	20	1.3
243	S 5	b	c	20	1.5
245	T 5	b	a, d	65	6.0
247	T 5	b	a, d	25	2.4
253	T 5	b	b, d	30	3.5
255	S 6	f	c	25	0.5
257	S 6	b	b, d	30	10.0
261	P 6	b	b, d	20	2.5
265	R 6	b	b, d	80	8.7
267	Q 6	b	b, d	70	13.4
268	T 8	b	b, d	35	2.6
269	Q 6	b	c	40	4.6
270	U 8	b	a, d	20	1.8
271	R 6	b	c	30	3.0
272	S 8	b	b, d	25	1.2
273	Q 7	b	c	150	6.6
274	R 4	b	a, d	20	3.0
275	Q 7	b	c	30	30.6
276	T 6	b	c	20	2.0
277	Q 7	b, g	c	60	1.4
278	T 7	b	b, d	15	1.8
280	T 7	b	b, d	25	0.5
282	T 7	b	c	20	1.2
283	P 6	b	b, d	20	0.5
284	T 6	b	b, d	30	1.2
286	T 6	b	b, d	30	2.6
289	R 8	b	c	30	2.0
292	S 8	b	b, d	10	6.2
293	S 7	b	a, d	20	4.0
294	S 7	b	c	10	7.8
295	S 7	b	c	15	1.2
296	S 7	b	b, d	35	1.5
297	S 7	b	a, d	20	0.8
298	S 7	b	c	20	5.0
299	S 7	b	a, d	20	0.9
301	R 7	d	c	20	2.2

QUARRIES AND PITS

Priority Areas 11 & 12

MAP REFERENCE NUMBER	MAP IDENTIFI- CATION SQUARE	MATERIAL a. stone b. sand c. unknown d. clay e. reservoir f. open cast shale g. limestone h. roadstone	HOLDING WATER - a. yes b. partly c. no d. impossible e. kept dry by pump	DEPTH (feet)	AREA (acres)
235	S6	e	a	20	0.5
237	S5	e	a	10	0.6
249	T6	a	b	80	8.6
* 291	S7	a	c	60	3.8

* denotes Quarry or Pit being filled with Council refuse

STRUCTURES

Priority Areas 11 & 12

MAP REFERENCE NUMBER	MAP IDENTIFI- CATION SQUARE	TYPE a. sports field b. pit head c. farm outbuildings d. builder's yard e. education f. fence g. residences h. industrial j. commercial k. brick works m. public services	MATERIAL a. galv. iron b. brick c. wood d. asbestos cement e. glass f. stone g. concrete h. steel j. vacant	SURROUND-AREA ING AREA (square AFFECTED feet (acres) unless other- wise stated)
209	P4	c	b, c	3.0 200
210	S7	j	a	1.0 1,600
227	R5	h	b	- 200
229	S5	c	a, b, c	1.0 1,800
231	S5	b	b, h	- 192
239	S5	c	a	0.33 600
251	T5	c	b	0.5 3,000
259	P6	b	a, b, c, d	4.0 1,400
262	S9	g	b, f	0.2 3,000
263	Q6	b	b	5.0 6,225
279	Q7	b	b, g, h	22.6 174,240
281	Q6	b	b	0.5 80
285	P6	b	a, b, c	2.0 600
287	R8	b	a, b, c, d	2.22 280
290	S7	j	g	0.4 240

MAP REFERENCE NUMBER	MAP IDENTIFICATION SQUARE	USE a. railway b. elect- ricity	SLEEPER & LINE CONDITION a. used b. disused c. removed	VEGETATION a. yes b. partly c. no d. grass e. trees f. scrub	RELATIONSHIP TO NATURAL SURFACE a. above b. level c. below	LENGTH (miles)
233	S5	a	b, c	b, d	b/c	5/6
288	T6	a	b, c	c	a	1

Appendix E. EDUCATIONAL AND SHOPPING FACILITIES

TABLE 10.1 DETAILS OF EXISTING EDUCATIONAL ESTABLISHMENTS (PRIMARY AND SECONDARY) IN DECEMBER, 1964, BY TOWN GROUPS, AND PROPOSED FUTURE OF SAME

Note 1: For location of schools referred to by number in this Table, see Map 10.1 and Town Group Advisory Plans 14.1 to 14.10

Note 2: 1 stream is used to signify a school of 1 stream or less. Many of the schools have less than 1 stream capacity.

Town Group	School No.	Description of School	Proposal for 1985 situation
KIRKLISTON/ NEWBRIDGE	1	Kirkliston primary. 1 stream	To be abandoned.
	2	Newbridge primary. 1 stream	To be abandoned
WINCHBURGH	3	Winchburgh Primary. 1 stream	To be abandoned.
	4	R. C. Primary. 1 stream	To be abandoned.
	5	Junior Secondary School.	To be abandoned.
BROXBURN/ UPHALL	6	Primary. 1 stream	To be abandoned.
	7	Primary. 2/3 streams.	To become 2 stream primary
	8	R. C. Primary. 2 streams.	To be abandoned.
	9	Senior Secondary School	To be retained.
	10	R. C. J. Secondary School.	To be abandoned.
ECCLESMACHAN	11	Dechmont Infant School.	To be retained.
BATHGATE	12	Infant School.	To become a Nursery School.
	13	New 1 stream Primary School.	To be retained.
	14	Primary School. 2 streams.	To be retained.
	15	New 2 stream Primary School.	To be retained.
	16	R. C. Primary School. 2 streams.	To be retained.
	17	Bathgate Academy.	Soon to be replaced by new Academy and site taken over by Tech- nical College.
	18	Lindsay High	Site and buildings soon to be taken over by adjacent R. C. S. Secondary School. Lindsay High to be replaced in part by new Technical College and new Academy.
	19	St. Mary's R. C. Senior Secondary School.	To be retained and expanded on site of Lindsay High School adjacent.

Town Group	School No.	Description of School	Proposal for 1985 situation
BATHGATE (continued)	20	Bathgate Technical College	New facilities only just opened. Will be expanded in future.
ARMADALE	21	Primary School. 3 streams.	To be retained but to become a 2 stream school.
	22	Primary School. 1 stream.	To be retained.
	23	R.C. Primary School. 1 stream.	To be retained. Possible need for expansion.
	24	Junior Secondary School.	To be abandoned.
WHITBURN	25	Harthill Primary School. 1 stream.	To be retained.
	26	Primary School. 3 streams.	To be retained but to become a 2 stream school by 1985.
	27	Whitburn Junior Secondary School.	To be abandoned.
	28	Longridge Primary School. 1 stream.	To be retained.
FAULDHOUSE	29	Infant School.	To be expanded to a new 2 stream Primary.
	30	Primary School. 2 streams.	To be retained but to become 1 stream only.
	31	R.C. Primary School. 1 stream.	To be abandoned.
	32	Junior Secondary School.	To be abandoned.
ADDIEWELL	33	Breich Primary School. 1 stream.	To be retained.
	34	Stoneyburn Primary. 1 stream.	To be retained.
	35	Addiewell Primary. 1 stream.	To be abandoned.
	36	Stoneyburn R.C. Primary School. 1 stream.	To be retained and possibly expanded.
	37	Addiewell R.C. Primary School. 1 stream.	To be abandoned.
	38	Stoneyburn Junior Secondary School.	To be abandoned.
BLACKBURN	39	Infant School.	To be retained and expanded to form a 1 stream primary.
	40	Primary School. 2 stream.	To be retained.
	41	Primary School. 2 stream.	To be abandoned.
	42	R.C. Primary School. 2 stream.	To be retained.
	43	Seafield Infant School.	To be retained and improved.
WEST CALDER/ POLBETH	44	West Calder Primary School. 2 streams	To be retained but to become an R.C. Primary of 2 streams.

Town Group	School No.	Description of School	Proposal for 1985 situation
WEST CALDER/ POLBETH (continued).	45	R. C. Primary School. 1 stream.	To be abandoned.
	46	Senior Secondary School.	To be retained for possible use by New Town population increase.
	47	R. C. Junior Sec. School.	To be abandoned.
	48	Bellsquarry Primary School.	To be retained
MID AND EAST CALDER	49	Pumphreston Primary School. 1 stream.	To be replaced on extended site. No increase in accommodation.
	50	Midcalder Primary School. 1 stream.	To be retained but to become an infant school only.
	50A	Special E. S. N. pupils (17 off) at present housed in with No. 50.	To be relocated in existing No. 52.
	51	East Calder Primary School. 1 stream.	To be retained and expanded to become a 2 stream school.
	52	Oakbank Primary School. 1 stream.	School to accommodate E. S. N. pupils at present housed in No. 50.
	53	R. C. Primary School. 1 stream.	To be retained and expanded to become a full 1 stream school.
	54	Glenalmond Occupational Centre.	To be abandoned. New school and site required.
	55	East Calder J. Secondary School.	To be abandoned.
	56	Kirknewton Primary School. 1 stream.	To be retained.

APPENDIX E

TABLE 10.2

DETAILS OF NEW EDUCATIONAL ESTABLISHMENTS (PRIMARY AND SECONDARY) PROPOSED FOR 1985, BY TOWN GROUPS.

Note: For location of schools referred to by number in this Table see Map 10.2 and Town Group Advisory Plans 14.1 to 14.10.

Town Group	School No.	Description of School	Comments
KIRKLISTON/ NEWBRIDGE	57	New Primary School. 1 stream.	Replacing No. 2.
	58	New Primary School. 2 stream.	Replacing No. 1.
WINCHBURGH	59	New Primary School. 2 stream.	Replacing No. 3.
	60	New R.C. Primary School. 1 stream.	Replacing No. 4.
	61	New J. Secondary School.	Replacing No. 5.
BROXBURN/ UPHALL	62	New Uphall Primary School. 2 stream.	Now nearing comple- tion. Will replace No. 6.
	63	New Primary School. 2 stream.	Suggested to cater for increase in population.
	64	New Primary School 2 stream.	Suggested to cater for increase in population.
	65	New R.C. Primary School. 2 stream.	Replacing old No. 8.
	66	New R.C. Primary School. 1 stream.	Suggested to cater for increase in population.
	67	New J. Secondary School.	Suggested to cater for increase in population.
	68	New R.C. S. Secondary School.	To replace old No. 10 & to cater for population increase.
ECCLESMACHAN	69	New Infant School.	Suggested to cater for increase in population.
BATHGATE	70	New Primary School. 2 stream.	Suggested to cater for increase in population.
	71	New Primary School. 2 stream.	Suggested to cater for increase in population.
	72	New R.C. Primary School. 1 stream.	Already proposed and to cater for population increase.
	73	New Bathgate Academy.	Now nearing comple- tion.
	74	New J. Secondary School.	Suggested to cater for increase in population.
ARMADALE	75	New Primary School. 1 stream.	Suggested to cater for increase in population.
	76	New S. Secondary School.	Already under con- struction.
WHITBURN	77	New Primary School. 2 stream.	Suggested to cater for increase in population and also one stream from existing school No. 26.

Town Group	School No.	Description of School	Comments
WHITBURN (continued)	78	New R.C. Primary School. 2 stream.	Already proposed and construction to commence shortly.
	79	New R.C. J. Secondary School.	Suggested to cater for increases in population in Whitburn, Blackburn Fauldhouse and Addiewell.
	80	New S. Secondary School.	Already proposed to replace old No. 27. Construction to commence shortly.
FAULDHOUSE	81	New Primary School. 2 stream.	Already proposed and planned extension to existing Infant School No. 28.
	82	New R.C. Primary School. 1 stream.	Already proposed to replace old School No. 31.
	83	New J. Secondary School.	Already proposed to replace old school No. 32.
ADDIEWELL	84	New Primary School. 1 stream.	Suggested to cater for increase in population.
	85	New Primary School. 1 stream.	Suggested to cater for increase in population and to replace old school No. 35.
	86	New R.C. Primary School. 1 stream.	Suggested to cater for increase in population and to replace old school No. 37.
	87	New J. Secondary School.	Suggested to cater for increase in population and to replace old school No. 38
BLACKBURN	88	New Primary School. 1 stream.	Proposed addition to old Infant School No. 39.
	89	New Primary School. 2 stream.	Proposed to cater for increase in population and as a replacement for old school No. 42.
	90	New Primary School. 1 stream.	Suggested to cater for additional population.
	91	New S. Secondary School.	Proposed already to cater for increase in population.
WEST CALDER/ POLBETH	92	New Primary School. 2 stream.	Suggested to cater for increase in population.
	93	New Primary School. 1 stream.	Suggested to cater for increase in population.
	94	New Primary School. 2 stream.	This school is almost complete now as an R. C. 1 stream school. It can and will be extended to make it a full 2 stream school

Town Group	School No.	Description of School	Comments
WEST CALDER/ POLBETH (c continued)			and will be taken over by non-denominational Education Authority.
	95	New S. Secondary School.	This school is almost complete now.
MID AND EAST CALDER	96	Pumphreston New Primary School. 1 stream.	This is a required replacement to the old school No. 49. No expansion of existing facilities.
	97	New Primary School. $1\frac{1}{2}$ stream.	Suggested to cater for increase in population.
	98	New Primary School. 2 stream.	Suggested to cater for increase in population.
	99	New R.C. Primary School. 1 stream.	Suggested to cater for increase in population.
	100	New Residential Special-School.	To cater for children from old No. 54 and children of New Town.
	101	ten acres. New S. Secondary School.	Suggested as a replacement of old No. 55 and to cater for increase in population.
	102	New R.C.S. Secondary School.	Suggested as a replacement to old No. 48 and to cater for increase in population.
THE NEW TOWN OF LIVINGSTON	103	On the basis of present population predictions as set out in Table 10.1, the New Town will require approximately thirty three two stream primary schools, eight of which should be Roman Catholic; ten Senior Secondary Schools, three of which should be Roman Catholic; one Technical College.	
	to 146		

APPENDIX E

TABLE 10.3 LOTHIAN REGION: EXISTING SHOPPING FACILITIES: survey results showing numbers of shops, areas, organisation and physical condition of shops.

Town Name	No. Retail Trade Shops													Service Shops					Total No. Shops	Sales Area (sq. ft.).		Organisation	Condition																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	A	B	C	D	E	F	G	H	J	K	L	M																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																

Newbridge	1	-	1	-	-	-	-	5	400	-	3	2	-	1	4	-	5
Kirknewton	1	-	1	-	-	-	-	5	700	-	5	-	-	-	2	1	1
Dechmont	-	1	1	-	-	-	-	3	300	-	3	-	-	-	1	2	2
Uphall	2	-	-	-	-	-	-	3	400	-	2	1	-	-	1	1	1
Station																	
Ratho Station	3	-	-	-	-	-	-	3	600	-	1	-	2	1	1	1	1
Livingston	-	-	-	-	-	-	-	3	300	-	2	1	-	-	2	1	2
Bellsquarry	1	-	-	-	-	-	-	3	300	-	1	1	-	-	1	1	2
Breich	-	-	-	-	-	-	-	3	500	-	3	1	1	1	1	1	1
East Whitburn	2	-	-	-	-	-	-	3	300	-	2	-	-	-	1	1	1
Whiteside	1	-	-	-	-	-	-	2	150	-	1	-	-	-	1	1	1
Oakbank	-	1	-	-	-	-	-	1	100	-	1	-	-	-	-	-	-
Wilkieston	1	-	-	-	-	-	-	1	300	-	1	-	-	-	-	-	-
Totals	136	75	72	76	75	59	77	818	224,350	27,400	664	97	57	169	404	245	
Percentages													81%	12%	7%	21%	49% 30%

TABLE 10.4 PROPOSED TOTAL CENTRAL AREA LAND USAGE

No.	Town Group	1985 Population	C.A. Total sq.ft./ C.A. person Area ratio sq.ft.	% Area retained in C.A.	Comments	Town Centre Area sq. ft.	Town Centre Area acres	Shop area in Town Centre in sq.ft.	No. of Car Parks in Central Area	
1	Kirkliston/ Newbridge	3,500	25	87,500	100	Small town: one centre	87,500	2.0	12,500	45
2	Winchburgh	5,000	25	125,000	90	Small town: one centre	112,500	2.5	18,000	70
3	Broxburn/ Uphall	20,000	25	500,000	90	Two centres, 10% of shop area in local shops and two sub-centres totalling	125,000 200,000 125,000	3.0 5.0 3.0	20,000 30,000 20,000	100 160 100
4	Ecclesmachan	2,000	20	40,000	80	Small town. Two super - markets	20,000 20,000	0.5 0.5	3,500 3,500	15 15
5	Bathgate	22,500	30	675,000	75	Large town: one central area, six sub-centres	506,250	12.0	67,500	400
6	Armadaile	10,000	25	250,000	80	One centre, 20% of shop area in local shops	200,000	5.0	30,000	130
7	Whitburn	10,000	25	250,000	80	One centre, 20% of shop are in local shops.	200,000	5.0	30,000	130
8	Fauldhouse	6,000	25	150,000	90	One centre, 10% in local shops	135,000	3.0	20,000	70
9	Blackburn	15,000	25	375,000	80	One centre, 20% in local shops	300,000	7.0	46,000	210
10	Addiewell	8,000	25	200,000	90	One centre, 10% in local shops	180,000	4.25	30,000	100
11	West Calder/ Polbeth	13,000	25	325,000	90	Two centres, 10% in local shops	178,750 113,750	4.0 2.5	28,000 17,000	125 65
12	Mid & East Calder	15,000	25	375,000	90	Two centres, 10% in local shops	206,250 131,250	5.0 3.0	32,000 20,000	140 70

Appendix F. WASTE COLLECTION, TREATMENT AND DISPOSAL

by J. C. Wylie, Consultant
on Utility Services.

INTRODUCTION

- 1 The Services covered by the following report concern the collection, treatment and disposal of the dry and liquid wastes coming from:

- a dwellings
- b trade and industry

It is a remarkable fact that the responsibility for establishing these services out of public funds only began to be assumed by Local Public Health Authorities some hundred years ago. During the intervening years improved techniques have made it possible for efficiently balanced services to be established which meet the ever increasing demand for high Public Health standards. However, although past experiences can give some guidance, they cannot dictate the form which efficient and balanced services will take in the future. This is so, not only because circumstances and requirements change but, more importantly, the character of the wastes to be handled changes with every change in the living and working habits of the community. Thus past experience can only be drawn upon to establish services which will be sufficiently flexible to allow them to meet the requirements of the future so far as these can be foreseen.

- 2 Within the Region, the two main agents in the collection and treatment of the wastes are the County Councils of Mid and West Lothian. In the former, sewage is the concern of the County Engineer's Department and refuse that of the County Cleansing and Transport Department. In West Lothian landward area, both sewage and refuse disposal are managed by the Sanitary Inspector's Department. The small burghs within the Region (Armadale, Bathgate and Whitburn) are autonomous units in these matters.
- 3 The present population of the Region is around 90,000. By the time Livingston has become established by the year 1985, this population will have increased to 230,000 and the dry wastes will have risen to around 180 tons per day from 70 tons, while the daily flow of domestic sewage will have risen to around 12,000,000 gallons from 4,500,000 per day.
- 4 What type of authority or group of authorities may come to be finally responsible for the proper collection and disposal of these wastes throughout the Region cannot be wholly anticipated, but it is essential for the establishment of satisfactory services that common standards of hygiene for the Region should be accepted by all the present responsible authorities.

TYPE OF WASTE

1. Water borne sewage

Water borne sewage is the fouled water supply of the population.

The sewerage systems required for the collection of the sewage within the Region and its mode of treatment are dealt with elsewhere, but we are concerned here with the treatment and disposal of the sludge which is a product of the sewage purification process.

Sewage purification involves the production of sludge at the rate of about $\frac{1}{3}$ of a gallon per head of the population per day. As it is produced, the sludge is fluid and foul, having a content of suspended matter (mainly organic) of about 5% by weight.

Thus from an ultimate population of 230,000 about 76,000 gallons of sludge containing about 16 tons of waste organic matter will fall to be disposed of daily.

2 Domestic Refuse

In contrast to water borne sewage, which is reasonably constant and predictable in quantity and composition, the rate of accumulation of domestic refuse accruing from a given population changes most significantly in quantity and composition as living standards are raised.

In Britain at the present time, domestic refuse accumulates at the rate of 5.8 cwt per person per annum, while in America the figure is 14.6 cwt. These figures may be taken as giving some indication of the extent of the problem with which the Public Health Authorities of the Region may be confronted by the year 1985, but they cannot be reasonably accepted as the basis on which to establish the Public Cleansing Services of the Region at the present time.

More appropriate guidance can be obtained from the adjacent City of Edinburgh where almost unique records of the altering character and composition of domestic refuse have been kept over the past thirty years. From these records, a comparison of the composition of refuse collected from a group of houses in (i) 1953 and (ii) 1963 with (iii) a group of all-electric, owner-occupied flats, each equipped with a garbage grinder, in January, 1964, is given below in the following Table:-

APPENDIX F. TABLE 11.1 A Comparison of Composition of Refuse

	(i) 1953	(ii) 1963	(iii) All-electric flats, 1964.
Dust and small cinders	58.38%	26.25%	4.29%
Large cinders	14.13	16.18	nil
Metals	4.80	7.99	15.71
Vegetable matter	3.17	9.40	12.14
Paper	7.95	27.21	42.50
Rags	1.35	1.87	2.14
Glass	5.02	7.92	20.36
Unclassified	5.20	3.18	2.86
	<u>100.00%</u>	<u>100.00%</u>	<u>100.00%</u>
Density cwt/cu. yd.	5.03	2.95	1.35

In addition to the above trends in the changing character of refuse, the Edinburgh records indicate a 1% increase in the rate of collection by weight per annum.

It seems reasonable to assume that the analysis contained in column (ii) above provides the most reliable guidance as to the constitution of the domestic refuse that will come to be dealt with by the Public Cleansing Authorities within the Region, and on this basis, the total quantity to be disposed of will rise to more than 700,000 cu. yds. per annum.

The increasing bulk of refuse is a factor which must be taken into account when methods of collection and disposal are being considered, but a factor of equal importance is the increasing commercial value of the constituent materials of the refuse.

On the basis of present day prices, the value of the classified materials under column (i) above, is about 14 shillings per ton of crude refuse, while those under column (iii) are about 70 shillings, mostly ascribable to the very high content of metals, paper and rags. Thus, improving standards of living may well result in the value of the constituent materials of the refuse falling to be disposed of within the Region reaching the conservative rather than fanciful value of around £200,000 per annum.

It cannot be expected that anything approaching the full commercial value of these materials could ever be fully recovered, but in the interest of national, as well as local economy, provision should be made for their exploitation to the fullest practical extent.

3 Trade and Industrial Wastes

The problem contained in the treatment and disposal of trade and industrial wastes with which a Public Health Authority might be confronted in the future, is not one which can be anticipated. The necessary degree of treatment and the means of disposal will be dictated by the quantity and nature of the wastes produced and therefore cannot be defined until these are known.

In any case, however, the wastes before discharge must be reduced to a degree of purity that will ensure that the natural environment of the community is not degraded to an unacceptable extent, or when they are to be discharged into them, the efficiency of the established waste disposal services are not impaired.

The necessary method of treatment of the wastes, and the apportionment of the cost thereof, from each specific trade or industry that comes to be established in the Region, will be matters for agreement between the Local Health Authority and the trade or industry concerned. It is therefore unnecessary for provision to be made within the public waste disposal services for exceptional future requirements of trade and industry except in so far as sewers and sewage treatment should be designed to receive such water as is available for trade or industry after domestic needs have been met.

TREATMENT AND DISPOSAL OF THE WASTES

1 Sewage Sludge

The bulk of the sewage sludge will accrue at the centres of sewage treatment serving the following town groups:-

APPENDIX F. TABLE 11.2 Quantity Of Sludge Per Day By Town Groups

		Ultimate Population	Quantity of Sludge (gallons/day)
a	Livingston/Calders	128,000	42,000
b	Broxburn/Newbridge	22,000	7,500
c	Bathgate	22,500	7,500
d	Blackburn	15,000	5,000
e	Whitburn	10,000	3,500
f	Armadale	10,000	3,500
g	Stoneyburn/Addiewell	8,000	2,500
h	Fauldhouse	6,000	2,000
i	Winchburgh	5,000	1,500
j	Kirkliston	3,500	1,000
		<u>230,000</u>	<u>78,000</u>

Under quite exceptional circumstances some quantities of sewage sludge in its fluid and foul state can be disposed of satisfactorily on agricultural land, but under no circumstances will this provide an adequate or reliable outlet for the disposal of the sewage sludge of a community. To ensure proper disposal the sludge must be exposed to some degree of treatment by drying.

Sludge drying can be effected on open beds or mechanically by means of filter, press or centrifuge.

The capital cost of sludge digestion and drying on beds is substantial, being about £3 per head of the population. Thus the cost of making this provision for the sludge coming from the population of the Region (exclusive of those already served) would exceed £500,000.

The capital cost of providing some mechanical method of drying would be much less but the operational charges (inclusive of labour, loan, power charges) for all methods are about the same - around five shillings per head per annum, or £9.0.0. per ton of dry matter treated.

The effect of all of these methods of drying is to reduce the moisture content of the sludge from about 95% to around 70%. The result achieved is to transform the sludge from a fluid to a rather glutinous condition. All of them ease the problem of sludge disposal but none of them wholly solve it. In its glutinous state the sludge remains objectionable. There is no reliable demand for it from agriculture, and its disposal by dumping merely gives rise to accumulating difficulties.

By further processing, the moisture content of the sludge can be reduced to around 10%. It is then in the form of a fine powder and can be marketed as a nitrogenous manure commanding a price of about £2.10. per ton when a market for it has been established, but the cost of processing then rises to over £20 per ton of dry matter.

In order to have complete control over the thorough disposal of the sludge some attempts have been made to burn it, but the costs then have risen to over £30 per ton of dry matter.

High processing costs can be avoided however when the sludge is looked upon as a suitable ingredient for the production of compost along with the organic content of domestic refuse, and this alternative solution is discussed later.

2 Disposal of Domestic Refuse

Local circumstances and requirements must have an influence on any decision as to the most appropriate waste-disposal method to be adopted, but the over-riding consideration must be the characteristics of the wastes themselves. The characteristics of the domestic refuse which will come to be disposed of within the Region can only reasonably be assumed to be something approaching those contained in column (iii) of the table of analysis.

The various methods of refuse disposal with comments on the advantages and disadvantages of these are:-

- a Controlled Tipping which involves the use of low-lying waste land for disposing of untreated refuse with the secondary purpose of making the land usable for some specific purpose.
 - i Wastes consisting of over 60% vegetable matter, paper and rags with metals (mostly tins) making up a further 25%, do not constitute suitable filling material. The present day value of paper, rags and tins is not less than £5 per ton and at these values, and in these quantities, they can be economically salvaged and are of greater value as basic materials for industry than they are as filling materials.
 - ii The increasing bulk of refuse, moreover, acts against its use as tipping material in its untreated state. Even with heavy (and expensive) machines designed to give maximum consolidation it is being found that tips are now being filled 60% more quickly than they were ten years ago.
 - iii Even when extreme care is taken in tipping operations, objectionable conditions do arise and difficulty in obtaining the necessary compacting will add to the incidence of burning tips caused by spontaneous combustion.
 - iv The Region is richly endowed with areas of waste land suitable for reclamation by tipping and the tipping of untreated refuse in these areas offers a cheap method of disposal. But under all circumstances, however, there will be a need for tipping space and the available sites for depositing wastes within the Region should be looked upon as local assets which should be used as economically as possible.

To prolong the life of available tipping space it is necessary to reduce the bulk of the crude refuse by Pulverisation or to reduce its bulk and total weight by Incineration or Composting.

- b Pulverisation involves the storage of crude refuse, the separation of salvagenable materials and the pulverisation of the residue by some means such as hammer mills, shredders or grinders.
 - i Pulverised refuse has a density of about 7 cwt. per cu. yd. as against 2 cwt. per cu. yd. with the crude refuse and it has the further advantage that, for some unexplained reason, it is unattractive to vermin.
 - ii Pulverisation would provide a satisfactory material for upfilling low-lying land of poor quality of the type which is found fairly extensively in the western part of the

RELATIVE COSTS

When the various methods of disposal of refuse and sludge are reduced to a cost per head per year of the population served, and the costs for disposal of the two wastes aggregated, it can be seen from the accompanying Tables that composting compares quite well with any combination of the other methods. Several of these methods, as pointed out previously, are not considered suitable or practicable, particularly for the New Town, but even comparing the cheapest alternatives with composting it can be seen that there is only a difference in cost of 1/5d per head of the population served per year.

If the compost produced from refuse and sludge can be considered to have a value of 10/- per ton (which is much less than its real value, even if used in place of top soil for rehabilitation works), and assuming that one-seventh of a ton of compost is produced per year for each head of the population, then composting clearly becomes the most economical method for dealing in a satisfactory manner with the disposal of both sewage sludge and household refuse.

At this stage, it is proper to put costs of disposal of refuse and sludge into perspective with the cost of collection of household refuse and collection and treatment of sewage: from the Tables, the average cost of disposing of both refuse and sludge by composting is just under 10/- per person per year, whereas the average cost of collecting household refuse is about 15/- per person per year, and the collection and treatment of sewage (excluding sludge) from the New Town of Livingston will cost in the order of £3 per year per person served based on repayment of the capital cost as presently estimated.

APPENDIX F. TABLE 11.3 Average Costs For Disposal Of Refuse

Method of Disposal	Average Cost Per Ton	Less Value of Salvage	Nett Cost Per Ton	Average Cost Per Person Per Year
Controlled Tipping	13s. 2d.	-	13s. 2d.	3s. 10d.
Pulverisation with Separation	25s.	9s.	16s.	4s.
Incineration with Separation	28s. 6d.	9s.	19s. 6d.	5s. 8d.
Separation and Composting with Sludge	30s.	9s.	21s.	6s. 1d.

APPENDIX F. TABLE 11.4 Average Costs For Sludge Disposal

Method of Disposal	Average Cost Per Ton of Dry Solids	Less Value of Sales	Nett Cost Per Ton of Dry Solids	Average Cost Per Person Per Year
Digestion, drying on beds and disposal	180s.	-	180s.	4s. 10d.
Mechanical dewater- ing and disposal of cake	185s.	-	185s.	5s.
Drying to a Powder and marketing as a fertiliser	400s.	50s.	350s.	9s. 5d.
Dewatering and Composting with Refuse	150s.	Value of Compost not de- ducted	150s.	4s.

CONCLUSIONS

- 1 The type of refuse which will accrue in the Region is unsuitable for tipping in its crude state and will require to be transformed by some mechanised process before being tipped, in order to ensure hygienic disposal and to conserve the available tipping space within the Region. In any case, the limited savings on overall costs which controlled tipping would effect, would not justify its disadvantages.
- 2 Incineration is the most costly of all mechanised disposal systems and it subscribes to air pollution. Its use should therefore be restricted to the disposal of bulky materials which can be readily burned but which cannot be processed in any other ways.
- 3 Pulverisation appears to be the cheapest type of refuse processing plant but this is only so when the value of the product coming from a composting plant is ignored and, even if it is considered somewhat more expensive than Pulverisation, Composting carries the advantages that it provides a solution to the difficult problem of sewage sludge disposal.
- 4 The difficulties involved in providing for the proper disposal of sewage sludge should not be underestimated and the fact that the composting of refuse provides a reliable and economic solution should be, in itself, a decisive consideration but, in addition, the composts produced will have a superior manurial value to that of pulverised refuse.
- 5 Within the Region, there will be a need for very large quantities of compost for the rehabilitation of land which has been subjected to industrial dereliction as well as for agriculture and horticulture. If these needs are not met by processing the refuse and sludge for compost production then substantial additional expenditure will be incurred in importing other suitable materials of some kind or another into the Region.

RECOMMENDATIONS

- 1 That uniform standards of waste collection, treatment and disposal should apply throughout the Region.
- 2 That a policy of conservation should be adopted and that so far as possible the industrially valuable materials in the refuse should be extracted and the organic content processed with sewage sludge for compost production, and only bulky materials which cannot be reduced by any other means should be burned.
- 3 That three separate refuse/sludge composting plants, each incorporating an incinerator for limited use, should be provided in a phased programme of construction at sites to be chosen within the Region as follows:-
 - a Near East Calder to serve the town groups of Livingston/Calders which will have a population of about 130,000.
 - b Near Broxburn to serve the town groups of Broxburn/Newbridge, Winchburgh and Kirkliston which will have a population of about 30,000.
 - c Near Blackburn (possibly on Whitehill Farm) to serve the remaining town groups of Bathgate, Blackburn, Whitburn, Armadale, Stoneymuir/Addiewell and Fauldhouse which will have a population of 70,000.

Note:- Plants sited as above would be convenient for the haulage of refuse and sewage sludge from the town groups they would serve and the composts produced by the plants would be respectively, readily available to the extensive Rehabilitation Areas at Pumpherston, Broxburn and Easter Inch Moss.

The town groups referred to above are those detailed in Table II.2 of this Appendix.

- 4 Consideration should be given to the possibility of the composting plant at present operated by the County Council of Midlothian at East Calder being made available for experimental purposes to establish the most suitable processing methods for treating the crude wastes and producing composts of the quality that will be required within the Region.
- 5 The present facilities for waste disposal within the Region can probably be made to meet requirements over the next five years. This period of time however, is no more than is required for the adoption of a general policy on waste collection, treatment and disposal within the Region and for the design and the phased construction of plants on sites yet to be determined. Decisions in respect of policy and the instructions to be given for the implementation of that policy, should therefore be made without undue delay.

Appendix G. COMMUNICATIONS

TABLE 12.1 TRAIN FREQUENCY - Edinburgh, Calders, Addiewell, Breich and Fauldhouse

	6.30 a.m.	6.53	8.15	8.43	11.46	1.20 p.m.	1.34	3.57	4.50	5.20	5.39	6.21	7.32	9.05	9.52	Total stops
Edinburgh	6.30 a.m.	6.53	8.15	8.43	11.46	1.20 p.m.	1.34	3.57	4.50	5.20	5.39	6.21	7.32	9.05	9.52	15
Mid Calder	6.46	7.11	8.34	8.59	12.06pm	1.37	-	4.15	-	5.40	5.59	6.39	7.48	9.22	10.06	13
West Calder	6.55	-	8.43	-	12.15	-	1.59	4.24	5.13	5.50	-	6.48	7.57	-	10.17	10
Addiewell	6.59	-	8.47	-	12.19	-	2.03	4.28	5.17	5.55	-	6.53	8.01	-	10.21	10
Breich	7.04	7.45	8.52	-	12.24	-	-	4.33	-	6.01	-	6.58	-	-	10.26	8
Fauldhouse N.	7.09	7.50	8.57	-	12.29	-	2.11	4.38	5.25	6.07	-	7.03	8.09	-	10.31	11
Glasgow	7.59	8.39	9.41	9.52	1.16	-	2.55	5.27	6.05	6.53	-	7.46	8.52	-	11.11	12
Glasgow	-	6.50	-	8.18	10.20	12.20 p.m.	3.50	-	4.35	5.16	6.20	9.55	-	-	-	9
Fauldhouse N.	6.57 a.m.	7.44	-	9.10	11.01	1.09	4.41	-	5.25	6.16	7.14	10.41	-	-	-	10
Breich	7.01	7.48	-	9.14	-	1.13	4.45	-	-	6.21	7.18	10.45	-	-	-	8
Addiewell	7.06	7.53	-	9.19	-	1.16	4.50	-	-	6.27	7.23	10.50	-	-	-	8
West Calder	7.10	7.57	-	9.23	11.10	1.22	4.54	-	5.34	6.32	7.27	10.54	-	-	-	10
Mid Calder	7.19	8.06	8.32	9.32	-	1.31	5.03	5.13	-	6.42	7.36	11.03	-	-	-	10
Edinburgh	7.35	8.22	8.49	9.48	11.31	1.47	5.19	5.30	5.53	6.58	7.49	11.15	-	-	-	12

SOURCE: British Railways, Passenger Services, Scotland, 7th September 1984 to 13th June 1985; Table 16.

TABLE 12.2 TRAIN FREQUENCY - Edinburgh, Linlithgow, Falkirk, Glasgow*

Edinburgh Linlithgow : : : Falkirk : : : Glasgow	4.35 a.m. - - - - - - - 5.32	6.30 - - - - - - - 7.40	6.50 - - - - - - - 8.19	7.35 - - - - - - - 8.40	8.10 - - - - - - - 9.10	8.30 - - - - - - - 9.30	9.00 - - - - - - - 10.06	9.30 - - - - - - - 10.30	10.00 - - - - - - - 11.00	11.00 - - - - - - - 12.00	11.30 - - - - - - - 12.30	12.00 - - - - - - - 1.00	
Edinburgh Linlithgow : : : Falkirk : : : Glasgow	1.00 - - - - - - - 1.55	1.45 - - - - - - - 2.55	2.30 - - - - - - - 3.30	3.00 - - - - - - - 4.00	3.46 - - - - - - - 5.30	4.00 - - - - - - - 5.55	4.30 - - - - - - - 6.13	4.45 - - - - - - - 6.22	5.15 - - - - - - - 6.35	5.30 - - - - - - - 7.09	5.45 - - - - - - - 7.10	6.00 - - - - - - - 7.15	6.15 - - - - - - - 8.20
Edinburgh Linlithgow : : : Falkirk : : : Glasgow	- 8.01 - - - - - 8.48	8.30 - - - - - - - 9.48	9.30 - - - - - - - 10.30	10.08 - - - - - - - 11.08	10.20 - - - - - - - 12.11	10.30 - - - - - - - 11.40	10.52 - - - - - - - 12.11	- - - - - - - 12.11	- - - - - - - 12.11	- - - - - - - 12.11	- - - - - - - 1.00	- - - - - - - 1.00	

SOURCE: British Railways, Passenger Services, Scotland, 7th September 1964 to 13th June 1965; Table 20

* Only the trains originating in Edinburgh or Linlithgow have been considered, as the westerly direction from these stations was considered to be most useful for the Survey Area residents.

APPENDIX G

TABLE 12.3 LOTHIAN SURVEY AREA - BUS FREQUENCIES

Road Junction Numbers	Buses/Day	Road Junction Numbers	Buses/Day
1 - 2	169	28 - 29	69
2 - 3	149	28 - 36	74
2 - 4	20	29 - 30	142
3 - 4	12	30 - 12	135
3 - 15	225	30 - 32	68
3 - 17	66	32 - 33	74
4 - 5	20	32 - 34	22
5 - 6	20	34 - 35	6
5 - 14	77	34 - 36	16
6 - 7	132	36 - 38	48
7 - 8	151	37 - 38	86
8 - 9	20	39 - 40	234
8 - 46	167	39 - 45	28
9 - 10	20	39 - 46	227
9 - 28	96	40 - 41	60
9 - 46	96	40 - 42	228
10 - 11	20	41 - 42	2
10 - 29	78	42 - 43	138
10 - 39	78	42 - 44	32
11 - 12	20	43 - 49	127
11 - 30	54	50 - 21	136
11 - 41	54	50 - 53	144
12 - 13	155	50 - 51	8
13 - 48	183	51 - 52	4
14 - 15	161	54 - 55	176
14 - 6	112	55 - 56	22
15 - 18	24	55 - 1	169
16 - 17	74	5 - 57	84
17 - 18	74	23 - 57	50
18 - 19	92	7 - 58	29
19 - 20	104	20 - 59	116
19 - 47	12	59 - 60	90
21 - 22	136	55 - 61	15
22 - 23	154	4 - 62	12
22 - 24	8	63 - 20	12
23 - 25	116	44 - 59	32
23 - 27	68	13 - 49	40
25 - 26	4	25 - 64	46
25 - 38	132	38 - 65	46
27 - 28	68	28 - 66	22

Refer to Diagram 12.2, Chapter 12, for location.

SOURCE: 'Bus timetable and fare schedule' - S.M.T. publication, 1963.

TABLE 12.4 LOTHIAN SURVEY AREA TRAFFIC VOLUMES FOR TRUNK AND CLASS I ROADS

CENSUS POINT	1954 Total ¹ pcu's/16 hour day	Motor Cycles	Cars	Buses	Light Goods	Heavy Goods	Pedal Cycles	Total ¹ pcu's/16 hour day	Design ² Capacity pcu's/16 hour day	% INCREASE 1961/ 1954	1963/ 1954
TRUNK											
1961											
A8	7616L	8, 612	4499	1005	781	5028	10	11, 443		33%	
	8057W	5, 320	3743	687	605	4187	23	9, 347		76%	
	7986W	7, 276	5343	1230	793	5478	24	13, 085	11, 000	80%	
	7985W	6, 350	4650	456	678	4719	13	10, 658		68%	
	7688M	8, 471	5593	1314	656	4895	46	12, 838		52%	
A9	7990W	5, 258	4929	843	535	3672	27	10, 222		94%	
	7991W	8, 723	4978	939	554	3882	18	10, 586	9, 000	57%	
	7992W	8, 329						13, 040		57%	
1963											
A706	7983W	1, 324						2, 201		67%	
	7982W	900						1, 927		114%	
	7981W	2, 036						4, 096		68%	
	7980W	1, 393						3, 152		126%	
	7979W	2, 085	1629	291	415	1584	40	4, 033	4, 800	83%	
	7978W	1, 936						3, 942		104%	
	7683M	540						1, 831		239%	
	7620L	1, 047						2, 318		121%	
A800	7989W	995						1, 714	4, 800	72%	
A89	8056W	3, 802						5, 383		42%	
	7987W	2, 583						4, 867	11, 000	88%	
	7988W	2, 206						3, 593		63%	
A705	7977W	-						4, 220		-	
	7976W	2, 508						4, 398	5, 400	75%	
	7975W	1, 321						2, 528		54%	
	7682M	1, 620						2, 876		77%	

TABLE 12.4 contd.

A71	7673M 7674M 7675M 7584L	4,543 3,143 1,822 1,206	216 140	3995 2649	663 600	568 303	2292 1829	64 30	7,798 5,551 3,516 2,455	6,000	72% 77% 93% 104%
A704	7681M	403							627	6,500	60%
A767	8169W 7685M	- 1,359							3,172 2,044	6,000	- 50%
A70	7670M 7671M 7672M	2,490 590 510							4,261 1,093 1,033	6,000	71% 85% 102%
A899	7984	3,495							5,626	11,000	61%
A801 ³	7922S	1,444							3,271		126%
A904 ³	7995W 7996W	1,476 1,957							3,002 3,172		103% 52%
A903 ³	7993W	7,648	223	6989	783	605	1272	37	9,909		30%

1 A unit used in traffic surveys to relate all traffic to the equivalent of motor car units; the following values were adopted here:

Motor Cycles, Cars, Light Goods	1.0 pcu
Buses and Heavy Goods	3.0 pcu
Pedal Cycles	0.5 pcu

2 The estimated capacity is for free flow of vehicles based on road width. No allowance has been made for built up areas or for poorly aligned sections of the Routes or for Junctions.

3 Out of the Survey Area.

Source: Traffic Counts, Scottish Development Department, Roads Division.

TABLE 12.5 TRAFFIC DESIRE WITHIN THE LOTHANS SURVEY AREA (pcu'a/18 hour day) 1985

Town Groups	Livingston New Town	M/E Calder	Polbeth	Upshall/Brosburn	Blackburn	Whitburn	Winchburgh	Addiewell	Fauldhouse	Kirkliston	Bathgate	Armadale	Total
Livingston New Town	-	1	(W.Cldr) ² 950	10,340	7,900	2,160	1,320	3,030	1,320	290	5,830	1,430	34,590
M/E Calder	1	-	1,200	2,090	890	(100) ³	270	(180)	(100)	(40)	490	(170)	5,480
Polbeth	(W.Cldr) ² 950	1,260	-	760	940	270	(110)	970	250	(30)	720	(180)	6,440
Upshall/Brosburn	10,340	2,090	760	-	860	270	1,480	(210)	(140)	270	800	(230)	17,450
Blackburn	7,900	890	940	880	-	1,690	(130)	2,160	400	(20)	3,420	530	18,760
Whitburn	2,160	(190)	270	270	1,690	-	(50)	380	550	(20)	1,280	1,090	7,950
Winchburgh	1,320	270	(110)	1,480	(130)	(50)	-	(40)	(20)	(140)	(150)	(30)	3,740
Addiewell	3,030	(180)	970	(210)	2,160	360	(40)	-	(150)	(20)	440	(110)	7,890
Fauldhouse	1,320	(100)	250	(140)	400	550	(20)	(150)	-	(10)	720	680	4,320
Kirkliston	290	(40)	(30)	270	(20)	(30)	(140)	(20)	(10)	-	(100)	(30)	970
Bathgate	5,830	490	720	800	3,420	1,280	(150)	440	720	(100)	-	2,540	18,490
Armadale	1,430	(170)	(180)	(230)	530	1,090	(30)	(110)	660	(30)	2,540	-	7,000
TOTAL	34,590	5,480	6,440	17,450	18,780	7,950	3,740	7,690	4,320	970	16,490	7,000	

¹Interaction between the Calder Town Group and Livingston was not determined as the Town Group was considered to be within the influence of the New Town.

²Interaction between the Polbeth Town Group and Livingston was not determined (except for West Calder) for above reason.

³Parentheses denotes interactions which were considered to be so small that their value was unable to be accurately shown on the Traffic Desire Maps.

APPENDIX G

TABLE 12.6 TRAFFIC DESIRE OUTWITH THE LOTHIAN'S
SURVEY AREA (pcu's/16 hr. day) 1985

Regional Direction	NORTH ¹	EAST ²	SOUTH ³	WEST ⁴	TOTAL
Town Groups					
Livingston N. T.	13,800	42,900	480	28,000	85,180
M/E Calder	2,070	10,050	(60)	3,460	15,640
Polbeth	1,630	5,060	(90)	3,680	10,460
Uphall/ Broxburn	5,950	14,980	(80)	5,520	26,530
Blackburn	2,740	5,080	(90)	7,620	15,530
Whitburn	1,720	2,630	(90)	8,340	10,780
Winchburgh	1,790	3,140	(10)	1,120	6,060
Addiewell	1,000	2,700	(80)	2,660	6,420
Fauldhouse	940	1,530	(50)	3,820	6,340
Kirkliston	1,220	2,300	(10)	600	4,130
Bathgate	6,130	7,630	(80)	10,910	24,750
Armadale	2,720	3,390	(40)	4,850	11,000
TOTAL	41,710	101,390	1,140	78,560	222,820

- 1 Northern Towns include: Falkirk, Grangemouth, Linlithgow, Bo'ness, Stirling, Alloa, Denny, Alva, Tillicoultry, Queensferry, Buckhaven, Burntisland, Cowdenbeath, Inverkeithing, Kinglass, Lochgelly, Dunfermline, Kirkcaldy, Glenrothes, Cupar and Kinross.
- 2 Eastern Towns include: Edinburgh, Musselburgh, Bonnyrigg, Dalkeith, Loanhead, Penicuik, Cockenzie, Haddington, Prestonpans, Tranent, Dunbar and North Berwick.
- 3 Southern Towns include: Peebles, Innerleithen and Lanark.
- 4 Western Towns include: Cumbernauld, Kilsyth, Kirkintilloch, Milngavie, Bearsden, Glasgow, Clydebank, Dumbarton, Airdrie, Coatbridge, Motherwell, Hamilton, Rutherglen and East Kilbride.

Appendix H. EXISTING PLAYING FIELD FACILITIES

TABLE 13.1

The following are the playing field facilities provided by the District Councils and the Burghs of West Lothian

DISTRICT OF WHITBURN AND LIVINGSTON (1953 Census)		Acres
a	Livingston Village 1 Football Pitch, 1 Playground	2.0
b	Livingston Station 1 Football Pitch, 1 Playground	2.0
c	Seafield 1 Football Pitch, 1 Playground	3.9
d	Blackburn Riddochhill K. G. 1 Playground, 1 Pavilion	2.0
	Mosside 1 Football Pitch, 1 Playground	2.3
e	Fauldhouse Fauldhouse 1 Football Pitch, 1 Putting Green, 1 Playground, 1 Pavilion	8.5
	Braeside 1 Playground	0.35
	Croftfoot	2.0
	Parkview	0.33
f	Stoneyburn Stoneyburn 1 Playground, 1 Pavilion	2.0
	Bents (Righton Terrace) 1 Football Pitch, 1 Playground	5.3
	Bents (Garden City) 1 Playground	0.3
g	East Whitburn Redmill 1 Playground, 1 Pavilion	1.3
h	Longridge 1 Football Pitch, 1 Playground	4.4
i	Harthill Greenrigg 1 Football Pitch	0.33

j	Breich	
	Murrayfield	10.0
k	Westwood	
	1 Playground	0.05
l	Dechmont	
	1 Football Pitch, 1 Playground	1.5

DISTRICT OF UPHALL (1963 Census)

a	Broxburn	
	Buchan Park	
	3 Football Pitches, 2 Tennis Courts, 1 Bowling Green, 1 Putting Green, 1 Running Track, 1 Playground, 1 Pavilion	20.8
	Public Park	
	2 Football Pitches, 1 Hockey Pitch	
	3 Pavilions	7.5
	Fivestanks	
	1 Playground	1.0
	Cardross Play Centre	1.0
	Broxburn Bowling Green	
	1 Bowling Green, 1 Pavilion	0.5
b	Uphall	
	Glebe Park	
	1 Putting Green, 1 Playground	2.81
	K. G. Field	
	2 Football Pitches, 1 Pavilion	4.9
	Middleton Bowling Club	
	1 Bowling Green, 1 Pavilion	0.7
c	Ecclesmachan	
	Village Green	
	1 Playground	0.11
d	Threemiletown	
	Playpark	
	1 Football Pitch, 1 Playground	2.38
e	Uphall Station	
	Recreation Ground	
	1 Football Pitch, 1 Tennis Court, 1 Bowling Green, 1 Putting Green, 1 Playground, 1 Pavilion	2.5

DISTRICT OF WINCHBURGH AND KIRKLISTON (1963 Census)

a Winchburgh

Niddry Road	
2 Tennis Courts, 1 Putting Green, 1 Pavilion	1.05
Craigton Place - Play Centre	
1 Playground	4.04
Millgate Play Centre	
1 Playground	0.10
Craigton Place - Scottish Oils Ltd.	
1 Football Pitch	1.73
b Kirkliston	
Station Road Play Centre	
1 Playground	0.03
c Dalmeny	
Dalmeny Recreation Ground	
1 Football Pitch, 1 Playground	1.3
d Newton - Play Centre	
1 Playground	0.165

DISTRICT OF BATHGATE AND TORPHICHEN(part of) (1963 Census)

a Armadale	
Harestanes Road Recreation Ground	
1 Playground	1.0
Avondale Recreation Ground	
1 Playground	0.5
b Bathgate	
Whiteside Recreation Ground	
1 Football Pitch, 1 Playground	3.0
Standhill Recreation Ground	
1 Playground	1.25

BURGH OF BATHGATE

Kirkton Public Park - Edinburgh Road	
4 Tennis Courts, 1 Bowling Green, 1 Putting Green, 1 Playground, 1 Pavilion, 1 Bandstand, 1 Paddling Pool	18.3
Recreation Ground - Glasgow Road	
2 Football Pitches, 1 Cricket Pitch, 1 Running Track, 2 Playgrounds, 1 Pavilion, 1 Curling Rink	9.22
Burgh Muir - Muir Road	
1 Football Pitch	3.27
Marchwood Crescent	
1 Football Pitch, 1 Playground	2.11
Dykeside Road	
1 Football Pitch, 1 Playground	2.09

	<u>Acres</u>
Windyknowe Crescent 1 Football Pitch, 1 Playground	1.17
Glenmavis Drive 1 Playground	0.81
Bruce Road 1 Playground	0.75
Balbardie Avenue 1 Playground	0.70
Lothian Street/Dundas Street 1 Playground	0.53
Charles Crescent 1 Playground	0.50
Monkland Road 1 Playground	0.494
Falside Crescent 1 Playground	0.344
Hill Street 1 Playground	0.006
Edinburgh Road Bathgate Golf Club	109.760
Hardhill Road - Bathgate Thistle J.F.C. 1 Football Pitch, 1 Pavilion	5.23
Balbardie Road - Bathgate Bowling Club 1 Bowling Green, 1 Pavilion	0.683
Torphichen Street - LNER Bowling Club 1 Bowling Green, 1 Pavilion	0.303
Glasgow Road - St. Columba's Episcopal Church 2 Tennis Courts	0.293
Marchwood, Kirr Road - Lindsay High School 1 Tennis Court	0.254
Edinburgh Road, Boghall Farm West Lothian Education Committee 2 Football Pitches, 1 Hockey Pitch, 1 Pavilion	6.160
Torphichen Road - School Playing Fields 1 Football Pitch	0.770
BURGH OF ARMADALE (1963 Census)	
Shaw Avenue } Mayfield Drive } 4 Playgrounds Greig Crescent } Forrester Road }	2.0
Wood Park 1 Playground	1.0
North Street - Armadale Thistle A.F.C. 1 Football Pitch	3.0

South Street - Bowling Club 1 Bowling Green	1.0
Lower Bathville - Atlas C.C. 1 Cricket Pitch	4.0

BURGH OF WHITBURN (1963 Census)

Baillie Street - K.G. Playing Fields 1 Football Pitch, 1 Tennis Court, 1 Putting Green, 1 Running Track, 1 Playground	16.39
Manse Road - Public Park 1 Football Pitch, 1 Playground, 1 Pavilion	7.81
Millbank Square 1 Playground	0.203

The following are clubs in the Survey Area of West Lothian:

- a Junior (Own Playing Field)
Broxburn, Bathgate, Whitburn, Armadale
- b Secondary Juvenile
(District Council or Burgh Playing Fields)

Whitburn, Blackburn, Seafield, Harthill, East
Whitburn (ground taken over for housing),
Broxburn, Bathgate, Stoneyburn, Longridge,
Fauldhouse, Pumpherston, Blackridge.
- c Other Associations
(District Council or Burgh Playing Fields)

Boys' Guilds (8 teams)
Transport League (10 teams)
Merchants' League (10 teams)
Amateur League
Boys' Brigade (20 teams)
- d Other Teams
(District Council or Burgh Playing Fields)

Boys' Clubs (16 teams)
Boy Scouts
Other Organisations (20 teams)

In organised football each team is usually governed by a President, Secretary, Treasurer and a committee of five members. The Association is formed from one delegate from each club with the addition of a Secretary and Treasurer. Competition is usually for League, two or possibly three local cups, and two National Trophies. In a League comprising fifteen teams, a team would be expected to play (in all competitions) a minimum of say forty games (home and away).

The following are the playing field facilities provided by the District Councils of Midlothian:

	<u>Acres</u>
DISTRICT OF WEST CALDER (1963 Census)	
a Addiewell	
Loganlea Park 1 Football Pitch, 1 Playground	17.0
b Polbeth	
Limefield Recreation Ground 1 Football Pitch, 2 Tennis Courts, 1 Bowling Green, 1 Putting Green, 1 Playground, 1 Pavilion	23.0
c Breich	
Breich Park 1 Football Pitch, 1 Playground	5.5
d West Calder	
Burngrange Park 1 Football Pitch, 1 Running Track	3.0
Burngrange Park (Children's) 1 Playground	1.5
e Harburn	
1 Golf Course	
DISTRICT OF EAST CALDER (1963 Census)	
a Kirknewton	
Kirknewton Park 1 Football Pitch, 1 Playground	4.0
b East Calder	
East Calder Park 2 Football Pitches, 1 Hockey Pitch, 1 Playground, 1 Pavilion	6.0
c Midcalder	
Midcalder Park 1 Football Pitch, 1 Playground	4.0
d Pumpherston	
Pumpherston Park 1 Football Pitch, 1 Playground	2.0
DISTRICT OF CURRIE (1963 Census)	
Newbridge	
Lochend Park 1 Football Pitch, 1 Playground, 1 Pavilion	4.0

The following are clubs in the Survey Area of Midlothian:

Agape Youth Club (Polbeth)
Bellsquarry Youth Club (Boys)
Bellsquarry Youth Club (Girls)
Breich Youth Club
Loganlea Miners' Welfare Youth Club
Midcalder Youth Club
West Calder High School F.P. Club
West Calder St. Mary's R.C. Youth Club
West Kirk Youth Club, West Calder
West Calder Youth Centre

Other Clubs

Football Clubs

Juveniles: Pumpherstoun
West Calder

Amateurs: 14 Clubs

Uniformed Organisations: 13 Organisations

Youth Fellowships: 5 Fellowships

Appendix J. METHOD OF LANDSCAPE ANALYSIS

GENERAL SURVEY

The initial problem was to evolve a general system of classification which would divide the Region into clearly defined representative, simple types. It would be entirely objective and factual, and not subject to biased or variable assessments of 'landscape quality'. Such evaluation could be made individually and later, on the strength of the collected data.

From this study, general conclusions could be reached about the characteristics and distribution of the different regional landscape types, and general propositions made for their improvement and use.

Method

Three primary factors were chosen on which to base this analysis: Topography, Land Fertility and Woodlands. The choice was dependent on the availability of the survey data, and on the maximum number of inferences which could be drawn from a study of their relationships.

The visual presentation of this study was cartographic and photographic, the former being in three parts, Survey, Analysis, Proposals.

Survey

Overlays were prepared for each of the three factors:

- | | | |
|----------------|---|--|
| Topography | - | being the contours from 0 to 1,900 feet, by hundred foot intervals, in colour. |
| Land fertility | - | based on the Department of Agriculture analysis values, A+, A, B+, B, B-, C, D non-arable, with corresponding colours. |
| Woodlands | - | drawn from a study of the aerial photographs, field surveys and information supplied by the Forestry Commission, divided into high forest, scrub and plantation. |

Analysis

The purpose of this exercise was to simplify a complicated pattern of three inter-related factors, each of which was sub-divided many times. By expressing each factor in two halves, the following classes emerged:

- | | | |
|----------------|---|---|
| Topography | - | Lowlands, i.e. all land below eight hundred feet. |
| | - | Uplands, i.e. all land above eight hundred feet. |
| Land Fertility | - | Fertile, i.e. all A+, A, B+, B land. |
| | - | Poor, i.e. all B-, C, D non-arable land. |
| Woodlands | - | Wooded, i.e. all land covered by or near high forest, mature shelterbelts, dense or tall scrub. |

- Treeless, i.e. all land completely treeless or with only isolated trees, hedges or dwarf scrub.

The combination of these classes produced eight possible landscape types.

- 1 Lowland - fertile - wooded
- 2 Lowland - fertile - treeless
- 3 Lowland - poor - wooded
- 4 Lowland - poor - treeless
- 5 Upland - poor - wooded
- 6 Upland - poor - treeless
- 7 Upland - fertile - wooded
- 8 Upland - fertile - treeless

Since there is no 'fertile' land above eight hundred feet, groups 7 and 8 can be removed from the survey, leaving six basic types.

Each of them was plotted diagrammatically, the Land Fertility and Topography on one overlay, keyed 'Arable - Upland', and Woodlands on another, keyed 'Trees'.

INTERMEDIATE

The intermediate analysis in which further characteristics are added to elaborate the basic types follows the general regional landscape analysis, (the factors of which may change from region to region, and according to the availability of data). The information on which these characteristics are based is from direct survey or from primary sources, followed by further measurements of that material and finally inferences drawn from all the foregoing data.

DIRECT SURVEY

The direct survey covers two types of factor:

- the permanent
- and the changing;

thus introducing a temporal as well as a spatial element into the analysis. It includes those factors which, in the first instance, must be seen, measured or collected (for further analysis), in the field. The techniques include photography, instrumental surveying, and specimen collecting.

Permanent factors

The permanent elements in the landscape are those which change relatively slowly. On the intermediate scale, they include extensive land users, and factors which have a wide influence on the landscape.

The following are typical:

- | | | |
|------------|---|--|
| Topography | - | expressed by contours |
| Geology | - | solid, drift, soil classification, fertility values. |
| Woodlands | - | plantation, high forest, scrub. |
| Water | - | still, running, marsh. |

- Settlements - urban, industrial, rural.
- Roads - M's, A's, B's.
- Railways - passenger, goods, maintained but not used, derelict.
- Overhead lines - super-grid and grid.
- Farms and field boundaries
- Bings, tips and quarries.

Changing factors

The changing elements are those physical factors which are continuously altering the total external environment. The rate of these changes varies from the momentary ones of light and shade to the seasonal ones of climate.

They include:

- Climate (long term)) - both following the seasonable and
Weather (short term)) variable pattern of change in rain-fall, sunshine, wind and temperature.
- Vegetation - crops and natural, also following seasonable changes and long term successions.
- Biotic factor - those animals which have a regional influence, e.g. grazers, sheep, dairy and beef cattle.
- Human factor - altering various aspects of the environment at different rates.
- Mining - altering the drainage and stability of the ground above.

Appendix K. REPORT ON RECLAMATION BY S.P.A.L.D.A.

Recommendations for the Improvement of Food Production and Amenity in the 130 sq. mls. of Livingston Hinterland Area with reference to paras. 28-32 of the Livingston Designation Order 1962, by SPALDA, The Scottish Peat and Land Development Association - an Association of Farmers, Technicians and Interested Members, whose aim is the full development of underdeveloped farm land and marginal moorland towards increased Home Food production.

The basic fact that a new population of between 100,000 and 200,000 is to be established in the Livingston Area would suggest a need for more intensive and economic farming to meet the food needs of the new population, in at least meat, dairy produce, pork, poultry and vegetables. It would also require the creation of a micro-climate to ameliorate the present bleak and wind-swept moors and hillsides so that agriculture can be improved and so that the new population does not regret Glasgow.

We divide the Area into:-

- a The garden and recreational amenities of Livingston New Town.

Here we would recommend very strongly the planned conservation of the many tons of top soil to be removed for buildings and roads. This should be stockpiled to be used for good garden and park soil. (Bing reclamation would benefit from this top soil also).

- b The Lower Hinterland under 800 feet contour finds its difficulties of poor drainage in shallow peat underlain by stiff boulder clay, mine subsidence, drainage blocked by bings, and present uncertain subsidies: it extends to roughly 400,000 acres, centred on Armadale - Whitburn - Blackburn - Bathgate, extending north from the A71 road.

Here drainage is the central problem and for this an overall drainage plan is necessary, based on stream levels and stream channel improvement by which all main drainage channels will be defined, improved and maintained. Each farm should also have an interior survey to fit individual drainage problems into the overall plan. The main product to aim at is better grass for stockrearing and winter keep.

At the same time that the drainage survey is done, a soil survey of major deficiencies, chiefly lime and phosphate, should also be carried out.

In the short pilot survey SPALDA have done of a number of farms, it is obvious that the efforts at drainage and fertilising by individual farmers have brought their rewards. If this were done on an area basis to an overall plan, it could greatly improve the whole nature of farming in the lower hinterland area.

It is strongly suggested that this be planned on an area contractual basis with groups of farmers working with the same contractor with the certain saving of time, money and effort.

The bog drainage problem is already being worked out at Easter Inch Moss. We recommend that problems of peat reclamation in the area be referred to the Easter Inch Moss Scheme for guidance as to the best machinery and methods. Experiments in mixing shale with peat are being carried out there too.

Shelterbelts should be a matter of a modern pattern for every farm or group of farms. They would act as wind-breaks, a source of timber ready to hand for some of the needs of hamlets and the New Town, and a pleasing variant to monotonous moorland.

- c The Uplands Area above the 800 feet contour, comprising the Lang Whang and Bathgate Hills, might be served best by concentrating on a drive to improve the farms in the Harthill - Forth - Harperrig - Midcalder quadrilateral.

Again a long term programme of drainage and surface treatment and - a necessity here also for water conservation and control - shelter belt planting should be planned right to the hilltops where necessary, starting with a group of farms suitable for pilot working. The farm of Crosswoodhill shows what could be done in the area by drainage and fertilisers in the early 19th century, and still stands as an oasis of good farming in the bleak Pentland foothills.

We specially stress that shelter belt planting is a priority in this area where earlier planting of Scots pine has failed owing to bad drainage, or has been neglected, or is past its prime and needs replacing. A wider choice of species, e.g. *pinus contorta*, *sitka* spruce and the hardier broad-leaf species, is recommended.

This upland area with cooperation and proper safeguards could become the natural playground of the Livingston population for skiing on approved slopes, walking, birdwatching, etc.

It is the firm conviction of SPALDA that the Livingston Hinterland Area provides a most suitable locus for area reclamation with great opportunities for rehabilitation for food growing and amenities on the lines we have indicated. In so doing, pilot planning, which can have much wider application in other underdeveloped growth areas in Scotland, can be evolved.

We should finally like to suggest that an Agricultural Development Committee, composed of N.F.U. representatives and other farmers, foresters and others interested, be set up for the area to consider the necessary phases of the Plan, together with the subjects of grants, improvement of tenure, development of smallholdings and cooperation with the N.C.B., the Forestry Commission, the East of Scotland College of Agriculture, and S.W.O.A. We should be glad to be of assistance in this.

Data Available

A set of 6" maps on which the five classes of farm and types of farming, field by field, have been entered, are docketed at the office of the Agricultural Executive Committee for the Lothians, at 23 Eglinton Crescent, Edinburgh, 12.

APPENDIX K

TABLE 15.1 SUMMARY OF SAMPLE QUESTIONNAIRE FOR LIVINGSTON AREA LAND RECLAMATION

Serial No.	Name of occupier and farm	Type	Arable/Rough/Total acres	Reclaimed acres	Period	Shelterbelts	Stock	To be reclaimed
1	David T. Tod, Jr. Blackhills, West Calder.	owner occupier	190	38	1952-63	none	increased cattle and sheep	50 acres needs fertilisers
2	W. & A. Kirkwood Blackridge & Drumelsie.	o. o.	453	100	1955-63	none	increased dairy cattle and sheep	100 acres needs drainage
3	James Robb Blackberryhill, Whitburn.	o. o.	229	65	1953	none	increased cattle	town development expected
4	Peter C. MacDonald Colzium, Kirknewton.	o. o.	2000	-	-	40 acres planned	cattle and sheep	60 acres
5	James Hamilton Crosswoodhill, West Calder.	o. o.	1700	-	-	28 acres	cattle and sheep	130 acres drainage needed
6	H. H. Hamilton East Cairns, etc. Kirknewton.	o. o.	1200	150	1930-50	8 acres poor	increased cattle and sheep	100 acres peat reclamation
7	Robert Stewart Longford, West Calder.	o. o.	100	675	1940-50	10 acres good value	increased dairy cattle and sheep	drainage needed
8	M. H. V. Spurway Newpark, Middalder.	o. o.	60	-	-	28 acres scrub to clear	-	-

APPENDIX K

TABLE 15.1 (cont.)

Serial No.	Name of occupier and farm	Type	Arable/Rough/Total acres	Reclaimed acres.	Period	Shelterbelts	Stock	To be reclaimed
9	R. Crighton Niddry Mains, Winchburgh, West Lothian.	tenant	450	-	-	heavily wooded useful	sheep	-
10	M. F. Barry Ormiston, Kirknewton.	O. O.	700	62	1959-63	30 acres planned	increased 55% cattle and sheep	120 acres drainage and fertilisers needed
11	J. W. Gibb & Son Rusha Farm, West Calder.	O. O.	185 140 325	60	1951-64	8 acres	increased 150% dairy cattle	130 acres drainage and fertilisers needed
12	R. C. Hamilton South Cobbinshaw and Handaxwood, West Calder.		2829	64	1954-61	none	increased cattle and sheep	12 acres
13	David Rennie West Torphin, West Calder.	O. O.	360	64	1956-57	none	increased x 2 cattle and sheep	20 acres drainage needed
14	Matthew Hamilton Woolfords, West Calder.	O. O.	1314	60	?	23 acres good value	increased cattle and sheep	-
15	J. Steel Bogend and Forrest Burn, Blackridge.	O. O.	263	15	1958-59	none	increased dairy and eggs	48 acres drainage needed

Serial No.	Name of occupier and farm	Type	Arable/Rough/Total acres	Reclaimed acres.	Period	Shelterbelts	Stock	To be reclaimed
16	G. K. Mathewson Overhill House Farm, Armadaale.	O.O.	181	17 20	1954 1956	7.1 acres need replanting	Increased store sheep and cattle	50 acres drainage needed
TOTALS			13011	765		many shelter - belts need planting or replanting. Value is largely understood.	12 improvers report large % increase	818 acres

NET IMPROVERS' HOLDINGS:- 8801 acres.

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NET IMPROVERS' HOLDINGS:- 8801 acres.

Reclaimers' Reports - Summary from 16 of 25 Farmer Improvers Addressed

Out of 12 improvers with a total holding of 8801 acres the total improved in the last 30 years is 765 acres and this has in all cases produced a very considerable increase of stock, particularly wintering. The same farms report a further 818 acres awaiting improvement. Much of the increased capacity has come from drainage, liming and reseeded without ploughing; indeed ploughing produces rushes on wet peat on top of clay.

It is notable that the great majority of these are owner occupiers. Half of them have some shelter belts and those who have report them of considerable value, particularly in winter. Drainage appears to be the main problem.

This is a specimen survey, the findings of which would probably be applicable in other parts of the Livingston Development Area.

The Almond River Head-waters

The main Almond stream is poisoned and polluted from its source on the Harthill, Shotts and Pauldhouse moors, but its main tributary, the Breich Water, has a larger open moorland catchment before it gets involved in mine and township drainage. The other tributaries flowing from the Pentlands (the Harwood, Cobbinshaw and Crosswood Burns) are free from pollution (other than farm and compost pit drainage) until they reach the Calder townships.

Particularly if there is to be a ponding of the main stream to make a 'Livingston Loch' there is need for a comprehensive programme to establish forests in the higher elevations of all these catchments, not only in a grid of shelter belts but also in wider strips of forest running right up the hill to the tops (usually 1100 feet). A forest canopy and improved drainage would ensure a much more regular run-off of usable water throughout the year, and a reduction in the sudden peak floods by spreading them out in time. The land use problem above 700 feet must have as its main objectives afforestation, better grassland, and drainage where needed.

Ponding the Almond

The fall of the Almond is very slight, being only 17 feet per mile in the 14 miles of channel between Harthill Mains and Pumpherston Weir. Any damming project would have to be carefully scrutinised by a highly skilled engineer to ensure that the effects both upstream and downstream would be foreseen. Such possibilities as the fouling of flooded shallows with already polluted water; the raising of the sub-soil water level around the chosen housing area south of Livingston village; and the possible blocking of drainage outlets from the bogs and mosses, should be kept in view for any Livingston Loch project.

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1



2



1. Westwood bing: a prominent landmark.
2. Upland moor, near Benhar, Fauldhouse.
3. Typical industrial spoil.
4. Abandoned quarry at Winchburgh.
5. Typical disused industrial buildings.
6. Fine trees: Calder Park estate.
7. A pleasant stretch of the Breich Water.
8. Pentland Hills, Harperrig Reservoir and Cairns Castle.



3



4



5

6



7



8





9

9. Kirkliston village.
10. Aerial view of Bathgate.
11. Bathgate's shopping area.
12. Aerial view of Broxburn/Uphall.
13. Broxburn's main street.
14. Aerial view of Armadale.

(Subjects 9, 10 and 12 to 14 copyright *Scottish Pictures Ltd.*)



10



11

12



13





ADVISORY TOWN PLANS

LOTHIANS REGIONAL SURVEY AND PLAN

KEY

RESIDENTIAL AND ANGLARY USES

POST 1960 DEVELOPMENT

CENTRAL AREA USES

SERVICE AND LIGHT INDUSTRY

INDUSTRY

SEWAGE WORKS

OPEN SPACE, OR DESIGNATED OPEN SPACE

PRIMARY SCHOOLS (NUMBERS REFER TO APPENDIX E)

SECONDARY SCHOOLS (NUMBERS REFER TO APPENDIX E)

SCHOOLS, SITE UNDEFINED

CHURCHGROUNDS AND CEMETERIES

MADE WALKWAYS

PRIMARY DISTRIBUTOR ROAD

SECONDARY DISTRIBUTOR ROAD

LOCAL DISTRIBUTOR ROAD

SERVICE ROAD

REDEVELOPMENT ZONE

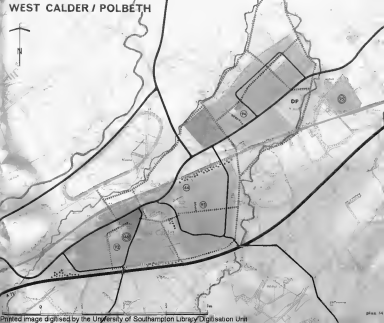
POSSIBLE SITE FOR BATHGATE

MARSHALLING YARD

SCALE: SIX INCHES TO ONE MILE

MID / EAST CALDER

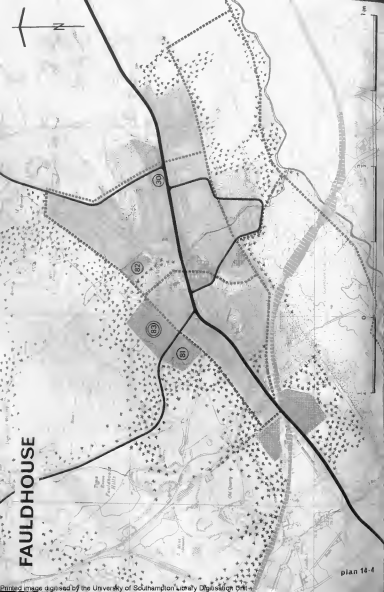
WEST CALDER / POLBETH



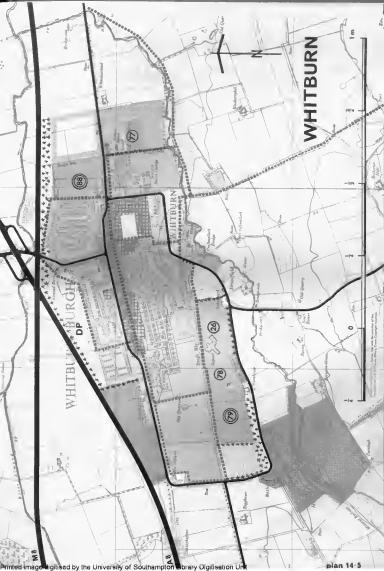
ADDIEWELL



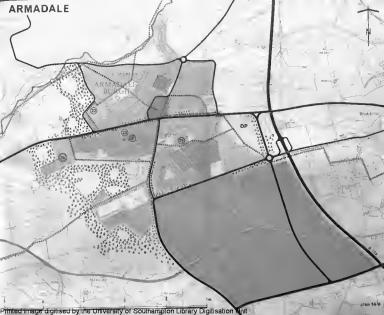
FAULDHOUSE



plan 14-4



ARMADALE

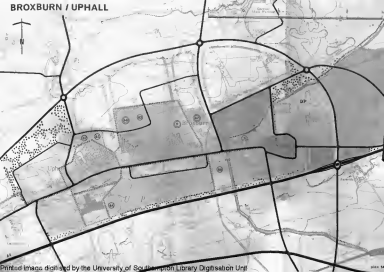


BATHGATE





BROXBURN / UPHALL



WINCHBURGH

ADVISORY TOWN PLANS

LOTHIANS REGIONAL SURVEY AND PLAN



KEY:

-  RESIDENTIAL AND ANCILLARY USES
-  POST 1945 DEVELOPMENT
-  CENTRAL AREA USES
-  SERVICE AND LIGHT INDUSTRY
-  INDUSTRY
-  SEWAGE WORKS
-  OPEN SPACE, OF WHICH DISTRICT PARK
-  PRIMARY SCHOOLS NUMBERS REFER TO APPENDIX B
-  SECONDARY SCHOOLS TABLES 101 AND 102
-  SCHOOLS, SITE UNDERRIED
-  CHURCHGROUNDS AND CEMETERIES
-  MAIN WALKWAYS
-  PRIMARY DISTRIBUTOR ROAD
-  SECONDARY DISTRIBUTOR ROAD
-  LOCAL DISTRIBUTOR ROAD
-  SERVICE ROAD
-  REDEVELOPMENT ZONE
-  POSSIBLE SITE FOR BATHGATE
-  MARSHALLING YARD

SCALE: SIX INCHES TO ONE MILE

LOTHIANS REGIONAL SURVEY AND PLAN



ADVISORY MASTER PLAN FOR LOTHIANS REGION

- RESIDENTIAL AREAS
- CENTRAL FACILITIES
- INDUSTRY
- PARKLAND
- AFFORESTATION
- AGRICULTURE
- IMPROVED MAINTENANCE
- LUNTING including industrial and network forest planting
- ROADS
- RAILWAYS
- AIRPORT
- POST AND TELECOMMUNICATION

Edinburgh City Boundary
The Lothians Regional Survey area
indicated by the black diagonal line.